

ille, F
with Valley Itinerary

(4)

1891

1st draft? ~~Hold~~
~~Court F...~~

This was published
in condensed form
(see letter inside)
Also see Ford Journal

~~for M. ...~~

~~...~~

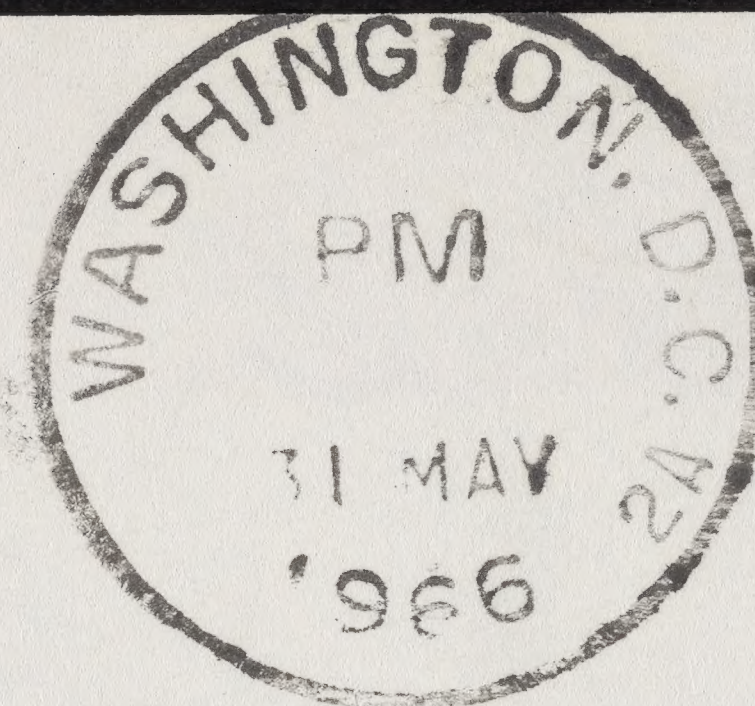
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Coville, F. V., & Applegate, E. I.

Catalogue. Cascade Mts., Oregon. 1898.

Plants Collected
in
the Cascade Mountains of Oregon
by
Frederick A. Coville and Elmer J. Ahlberg
in the years
1897, 1898.

Coville, F. V., & Applegate.

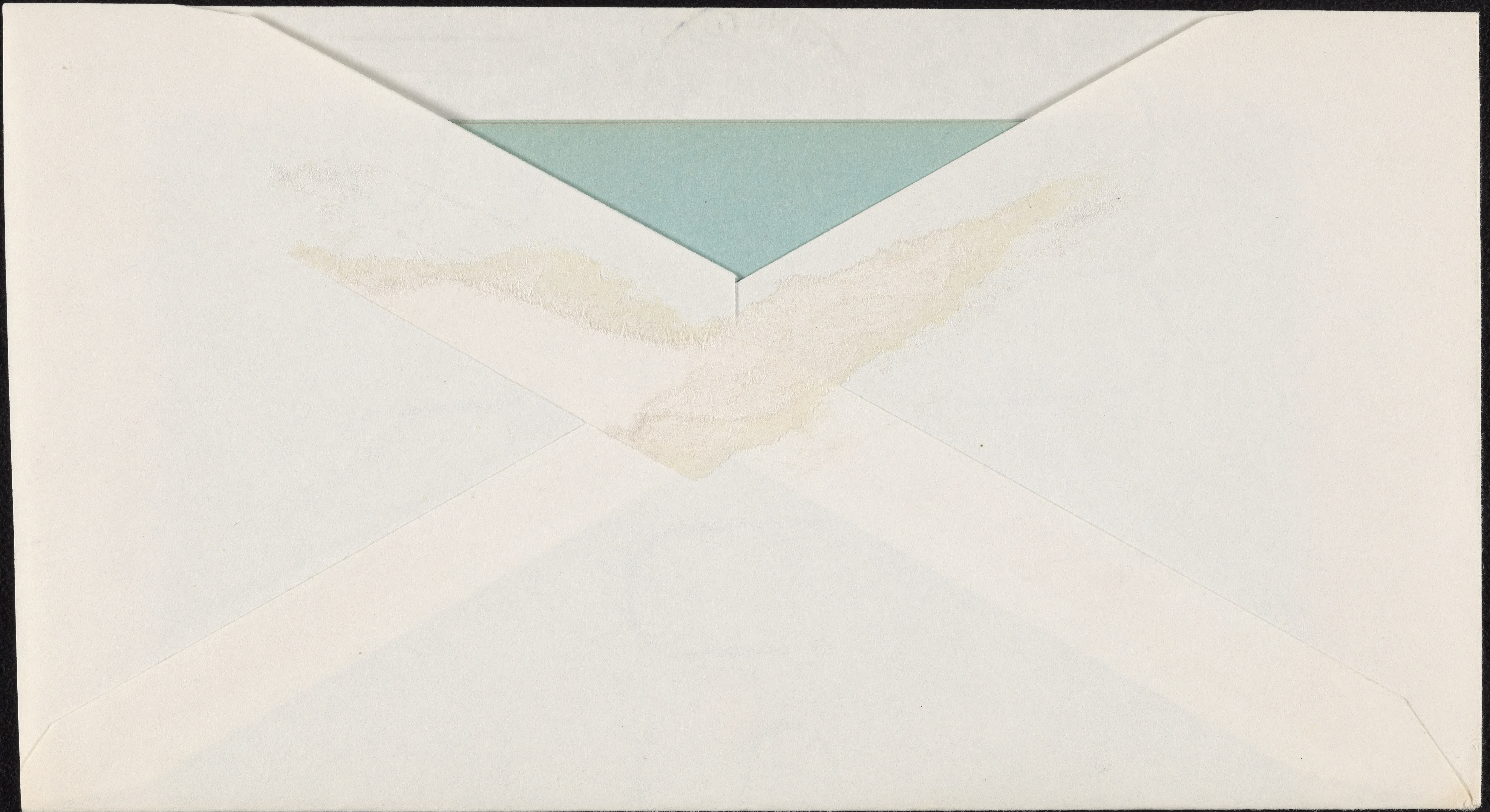
Catalogue. Oregon. 1897. I.

v.1

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Catalogue. Oregon. 1897. II.

v.2



UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
WASHINGTON

~~XDIVISION OF BOTANY~~

Plant Exploration and Introduction

September 26, 1934

Dr. Wm. R. Maxon,
Smithsonian Institution.

W. R. M. SEP 27 1934

Dear Dr. Maxon:

With this letter I am sending you the manuscript of my itinerary on the Death Valley Expedition. When the Botany of the Death Valley Expedition was printed, in 1893, the itinerary as first written had been much reduced under instructions from Dr. George Vasey, then Botanist of the Department. I suggest, therefore, that this manuscript be kept, as being more detailed than the published itinerary and therefore of possible use to other botanists working hereafter in the Death Valley region.

Very truly yours,

Frederick V. Coville

Frederick V. Coville
Botanist

FVC-G

Inclosure

[Death Valley Expedition]

by
F. V. Coville

Journal Itinerary

In compliance with the instructions of my commission I proceeded from Washington to San Bernardino, California, reaching there Dec. 24, 1890, by way of Salt Lake City. On the ~~24th~~ second day after leaving Washington, Mr. J. S. Palmer, acting Chief of the Expedition, arrived at Salt Lake City, and I reported to him as directed by the Atlantic and Pacific Railway route. From that time until Jan. 3, 1891, I was occupied in perfecting the botanical outfit of the expedition, and in becoming familiar, as far as possible, with the characteristic flora of the San Bernardino Valley. In both these matters I was greatly aided by Messrs S. B. and W. F. Parish and Mr. W. E. Wright, well known naturalists of southern California, and all residents of San Bernardino. These gentlemen have made many collecting excursions into the Mojave and Colorado Deserts and by their practical knowledge of the needs of such ~~exp~~ expeditions enabled me to complete the botanical collecting apparatus quite satisfactorily. ~~Mr. Frederick Funston of Carlyle, Kansas, reported for duty at San Bernardino Dec. 1, 1890.~~ ^{who was commissioned as my assistant on the expedition}

On the first day of January, 1891, our outfit having been nearly completed, Dr. A. K. Fisher and Mr. Funston set out ~~in advance~~ on horseback, in advance, for the Mojave Desert, ~~by way of~~ following the road through the Cajon Pass of the San Bernardino Mountains.

afternoon of the
On the ^{third} of January, 1891, I left San Bernardino²
by the same route, Mr. Palmer having purchased
the necessary portion of ~~this~~ ^{the general} ~~supplies~~ ^{outfit} there, and
having arranged to complete the supplies at Dag-
gett, a station in the Mojave Desert on the Atlantic
and Pacific Railway. The outfit consisted of a heavy
wagon drawn by four horses driven, ~~by our~~ ^{by a} team-
ster, ~~with~~ two saddle horses led behind, and myself
on horseback. It was ~~not until darkness~~ ^{quite dark} when

reached Martin's ranch, about 14 miles westward
from our starting-point. As the road from San Ber-
nardino to Daggett passed several ranches, we had
not provided ourselves with the ^{cooking} apparatus necessary
for camping out. We were ~~very~~ ^{disagreeably} surprised,
therefore, when the tenant of the ranch refused ~~to~~ ^{to} ~~give~~ ^{to}
to give us anything to eat although I offered him pay for it.
~~we give~~ ^{we give} ~~nothing~~ ^{nothing} ~~for~~ ^{for}
This was, with one exception, the only time during
the progress of the expedition when we were in-
hospitalably treated; ~~and~~ ^{indeed} in most ~~instances~~ ^{places} we
were received with hearty cordiality.

On the following morning, Sunday, Jan. 4, ~~we~~ ^{we} proceeded
up the valley of the Santa ~~Ana~~ ^{Ana} toward Cajon Pass. Before
we had gone many miles the very unpleasant dis-
covery was made that one of our team horses was
an inveterate balder. The teamster succeeded, however,
with my occasional assistance, in bringing his load

over the hilly and sandy road, a few miles past Cajon station ~~to the point at which~~ ^{page 3}
~~the road leaves the valley bottom of the Santa Ana, and~~
ascends the steep southern slope of the San Bernardino
mountains into Cajon Pass. The team was stopped
there and I rode a few miles up the slope to
Crowder's ranch. ~~where an~~ ~~team~~ additional ~~span~~ ^{pair} of
horses was procured ~~by~~ with the assistance of which
the wagon and its heavy load were drawn to Crow-
der's. I myself taking an extra saddle and horse went ~~back~~
~~to Cajon station, and there met Mr. Palmer who had~~
~~the place.~~
Came up from San Bernardino by rail. We camped
that night at Crowder's ranch, about three miles be-
low ~~the summit~~ of the pass.

Jan. 5, 1891. We left Crowder's and with the assistance
of the extra team reached the summit without mis-
hap. Here, at an altitude of ~~feet~~ ^{and below} the beginning
of timber on the mountains, the characteristic flora of
the San Bernardino ~~Valley~~ ^{abruptly} gives way to the equally
characteristic weird flora of the Mojave Desert. The ~~charral~~ ^{charral}
~~(charral)~~ (charral - a - val) ^{or} dense shrub thickets of the
south slope is replaced within a mile by the open
yucca forest of the ^{plateau} ~~desert~~. From the summit north-
ward and eastward the surface of the desert descends
with a gentle dip toward the valley of the Mojave
River.

The teamster ^{with the wagon} continued on the direct road to Victor
~~a station of the~~ ^{Railroad} On the Mojave River, while
Mr. Palmer and I turned off ^{eastward} ~~to the~~ ^{the} ~~first station~~

2

60

46

2a

Death Valley

See Fremont

inside no 364 -

Grubs + put -

pocket
with

2

(2a)

Smith
1880

California 4

the first station ^{north of Cajon Pass} on the ~~Southern Pacific~~ ^{California} railway
~~north of Cajon Pass~~. Our route lay through
^(Yucca brevifolia) yuccas ^(Juniperus californica) and junipers ^{which were}
not ^{over this area clearly} at this point arranged in
zones. At about eleven o'clock we
reached Hesperia and found Dr. Fisher
and Mr. Funston awaiting us.
They after leaving San Bernardino ~~on~~
January first, had stopped ^{about two miles below Cajon Station} ~~to the first~~
nights at Lawrence's ranch, and on the fol-
lowing day reached Hesperia, in the
vicinity of which they had since
been collecting ~~collected~~. After dinner we four ~~went on~~ ^{rode on}
toward Victor. At Hesperia the junipers
cease and are replaced by creosote-
bush (Larrea tridentata). The yuccas,
~~however~~ continued sparingly almost
down to the Mojave River at Victor;
yet they were far apart, and
the lack of junipers made the
desert open and monotonous.
We camped at the town of Victor.

It was our first ~~night~~ in the desert, 5.
~~Jan. 5, 1891. In the morning~~
and the frost that formed upon our
bed-canvases and the coyotes
(Ki-yō'tay) that howled about the
camp gave us a hint of our coming
new experiences ~~to~~
~~most of us.~~

Jan. 6, 1891. In the morning we
~~forded the shallow river~~
and followed the ~~#~~ road over the ~~desert~~
desert in the direction of Daguerre.
We passed over a summit to
the westward of a marble quarry
in an adjacent mountain, through
an oblong valley a few miles
in length, then over another
low divide and just ~~before~~ at nightfall
dark reached Stoddard Wells. ~~The~~
The water of a
sluggish spring in the barren
mountain ~~slope~~ ~~side~~ had been con-
ducted to the roadside in an iron
~~pipe~~ ~~leading~~, and there accumulated
in an immense iron-bound
wooden tub or tank. It could
be let out through a hole

6
near the bottom ^{into} a drink-
ing trough for ^{horses} ~~stock~~ and other
stock. This was the only source
of water between Victor and Daggett,
a distance of about forty miles. Of
the house that once stood near,
only the broken-down stone wall
remained, and in the lee of its
chimney we ^{threw down} ~~spread~~ our table-
canvas, set the lantern in the
chimney-hole and shivering
ate our cold supper. The wind
was cold and piercing, the sky
clear ~~is~~ a typical winter night in
the desert. We spread our beds on
the dry fine gravel among the
creosote-bushes and, ^{chilled and} without a
fire crawled into our blankets.

During the day we had made
our first close acquaintance with
the mountains of the desert, in
this region ^{perhaps better} ~~or~~ called ~~perhaps~~
~~crack~~ hills ^{for they were} ~~only~~ only a few hun-

dried feet in height, ^{rocky} treeless, with only ⁷ scattered creosote-bushes visible from the plain below, and even these wanting on steep slopes. The whole view was that of a rugged mass of bare rock, and an impression constantly forced itself upon a stranger to these regions that the mountains had never ~~in any season~~ been moistened with ~~rain or dew~~ ^{rain}.


Jan. 7, 1891. We ~~§~~ continued along the road through a country very similar to that seen on the preceding day, and late in the afternoon reached Daggett. This is a ^{settlement} ~~town~~ of perhaps thirty buildings, which serves as a railroad connection for silver and borax ^{mines in the} ~~mining~~ establishments adjacent mountains.

~~Jan. 8, 1891.~~

~~In the~~
Just before at evening I went with
Dr. Fisher out into the desert north-
ward from the town toward the dry
bed of the Mojave, while he
~~set traps for jumping rats and~~
~~snakes.~~

Jan. 8, 1891.

Dr. Fisher and I retraced
In the morning, ~~I went with~~
our route of the preceding evening. ~~to the~~
~~bed of the Mojave, crossed it and~~
~~turned northwestward toward the~~
~~stamp-mill about a mile~~
~~north of the river.~~

The bed of the river here ~~was dry, and~~
was composed of loose dry sand, and supported a
~~fall of drifting~~ ^{the} characteristic
vegetation ~~composed~~ ^{principally of}
~~shrubs~~ ^{the desert willow}
(*Chilopsis saligna*) and ^{shrubby composites} ~~two species~~
ites, ^a *Baccharis*  and *Lepidocarpus*
squamatum. Behind and in
~~the~~ clumps of these bushes the
sand drifts heavily from the west,
thus building up thick banks

10

while
tomato-berry[#], desert cassia^{##} and two
Lycium Andersonii ^{##} *Cassia armata*
cactuses^{###} ~~are~~ frequently occur.
Opuntia echinocarpa and *O. tessellata*

Jan. 10, 1891. Having completed our
outfit and stock of provisions
~~stock of outfit~~ we left
in the morning
Daggett, at about 9 o'clock, crossing
the Mojave River and travelling
northward ^{toward Death Valley} on the road ~~to Death Valley~~
known as the Lone Willow route.
The company consisted of Mr. Palmer,
Dr. Fisher, Mr. Funston and myself, on
horseback, ~~on~~ a four-horse ^{and a two-horse} team
with a ~~teamster, George Porter~~
~~driver, and a two-horse team~~
~~and driver hired temporarily, and~~
with their drivers, and a cook
~~Michael Barnes the cook.~~ My per-
sonal outfit was made up ac-
cording to the needs of the expedi-
tion. I wore ^{clothing of the ordinary kind but} heavy ~~for~~ the weather
was often cold, over my coat a
canvas hunting-coat, and often
in addition an overcoat. My

11
shoes were of the ~~kind~~ ^{kind} commonly used, but
later in the season, when there
was mountain climbing to be
done, it was found necessary
to substitute ~~the~~ ^{thick-bottomed} heavy ~~cowhide~~ ^{thick-soled}
^{miners} shoes, their soles ~~the~~ and heels
thickly set with ~~steel~~ hob-nails.
As for hats, ~~the~~ a wide-brimmed
felt or sombrero is most
serviceable in winter, while for
summer use a cork helmet
or one of the manufactured
equivalents which will shade
the eyes is ^{cooler and pleasanter.} ~~tighter and more~~
For firearm I carried ^{a forty-four} ~~a~~ Colt's ~~##~~
magazine ~~##~~ carbine, yet for general
camp use, in these regions at
least, a breech-loading shot-gun
is better. ^{An aneroid was used for measuring differences in altitude.} The apparatus for col-
lecting and ~~drying~~ ^{preserving} plants
consisted of a knife, a pick,
a portfolio, and two board

12
presses. The knife was of the kind
used by cotton inspectors in
~~the states~~ ~~the country~~ slash open the
~~sacking that~~ ~~covers~~ the cotton bales.

A description of it is given in
the ~~vol. 1~~ ^{vol. 1}, p. ~~10~~ ¹⁰. The pick
was ~~fashioned~~ ^{made} after a pattern in com-
mon use among ^{plant} collectors in
the southwest. Its head ~~is~~ ^{was} of steel,
with a slightly curved blade about
five inches long and at the ex-
tremity ~~one~~ ^{one} inch broad, and a head
about two inches long narrow-
ing to a point. The handle
~~is~~ ^{was} slender, of strong tough wood,
and about three feet long.
For digging plants in hard
clay soil ~~or~~ ^{in gravel, or} among broken stones,
or for uprooting cactuses and
other ~~spiny~~ shrubs, this instru-
ment ^{is} by far the best that I have ever used
~~is~~ ^{is} ~~unexcelled~~. In loam,
mud or sand the knife is

better. The portfolio was made of
 binders' boards covered with canvas
 and was usually carried ^{tied to the saddle.} from
 The presses were ordinary ^{ones} ~~made~~
~~the saddle.~~
 of boards, and straps were used
 for ^{applying} pressure.

My method of keeping field notes
 resolved itself, after a few weeks
 experimenting, into three heads, a cata-
 logue of specimens collected, a journal,
 and a slip system of ~~technical~~ ^{special}
 notes. In the catalogue there were
 entered for each ^{new} specimen, ~~and~~ ^{with} its dupli-
 cates, a number, the date, locality,
 station, altitude, and any desirable short
 remark. A specimen with these data
^{accurately} ~~carefully~~ recorded is, for the use of
~~systematic~~ and geographic botany,
~~a~~ ^{an} inestimably more valuable than
 many specimens whose history ~~can be~~ ^{is}
 but vaguely known.

In the journal were recorded
 under each date, the location of the

~~following~~ ^{course of the day's} nights camp, the journey, and a few ⁷ notes indicative of the general and vegetative features of the new country seen. When the camp was stationary for several days, the excursions made from it ~~are~~ ^{were} recorded that ~~the~~ a botanist subsequently using the journal on the same ground may be aided by it in locating the stations of particular plants in the collection. The details of work at camp in ~~preserving~~ ~~preparing~~ and cataloguing specimens, and in writing notes ~~were~~ ^{have been} omitted.

On the slip notes were recorded ~~items of interest~~ ^{facts} of all kinds, ^{which} ~~that~~ had reference to the botany of the ^{region} ~~life~~ ^{but} ~~which~~ were not shown by the specimens themselves or in the catalogue. These were ^{kept in large envelopes filed} ~~arranged~~ by subjects.

With this outfit for the botanical work of the expedition, we continued ~~on the~~ ^{through} the Mojave Desert northward

15
toward Death Valley. The country is tra-
versed by low ranges of mountains,
between two of which ^{lay} our road ~~lay~~
rising toward the north~~west~~^{west}. The vegeta-
tion continued ~~the same~~ as it was
about Daggett, except that a few miles
from the Mojave the joint-pine ceased,
and about nine miles from the
day's starting-point the tree-yucca
began again. The desert ~~the~~ cassia^{complanata}
~~and~~ another shrub^{##} occurred frequently^{##}

^{##} Hymenoclea salsola

in sandy washes, while ~~to other~~ ^{woody} desert

~~plants~~ ^{##} were occasionally seen

~~Lepidium~~ ^{##} Trinortii and Salicaria mexicana

and ^{##} ~~two~~ of the greasewoods[#]

[#] Atriplex hymenelytra and A. confertifolia

were often seen in ^{arid} the harder, more al-

kaline clay soil; while higher up the

gray joint-pine[#] and a leafless ~~tree~~ ^{shrub}

[#] Ephedra nevadensis

shrub[#] of the mint family became abun-

dant.

[#] Salicaria mexicana

We ~~made a dry camp~~ ^{made a dry camp} at night about four-
ten miles from Daggett, ^{and} about two miles
south of the first ^{main} divide ~~it~~ over which ~~the~~
~~and~~ ~~faces~~ ~~of~~ ~~the~~ ~~divide~~ ~~we~~ ~~were~~ ~~to~~ ~~pass~~ ~~before~~
~~reaching~~ ~~Death~~ ~~Valley~~

Jan. 11, 1891. We went on in the morn-
ing to the summit of the divide, ^{where}
they yuccas had become ~~thick~~ ^{thickened} ~~again~~ ^{into} a
forest. ~~we found~~ ~~the~~ ~~forest~~ ~~of~~

~~of~~ ~~the~~ ~~yuccas~~ The altitude was
not sufficiently high for ~~junipers~~
~~and~~ ~~but~~ ^{and} creosote-bush and a few
other plants ^{characteristic of} ~~this~~ ~~part~~ ~~of~~ ~~the~~ ~~zone~~
this ^{part of the zone} ~~part~~ were present. From the sum-
mit [#] *Grayia polygaloides*, *Ephedra nevadensis*, *Tham-*
nosma montana ^{and} *Tetradymia glauca* ~~comp. + comp. with~~ ~~only~~

mit we began ~~the~~ ~~gradual~~ the descent of
a ^{long} gentle slope into a basin called
Paradise Valley. The bottom of this
basin contains what is locally
known as a "dry lake". ~~This one,~~
where we crossed it, ^{was} about a
mile in ^{width} ~~diameter~~ ~~and~~ It was a level
expanse of smooth clay ^{entirely devoid of vegetation} ~~also~~ ^{hard}
that the ^{infection of the} ~~wagon~~ - wheels and ~~and~~ ~~the~~
choes of the horses was scarcely visible.

The lake was the dry sink ^{for the water} of the ~~entire~~ ¹⁷
~~entire~~ ~~basin~~ ^{which was}
~~entire~~ ~~basin~~ ^{which was}
miles in extent, and necessarily con-
tained a large quantity of alkaline
deposits; yet these did not ~~appear~~
on the surface of the clay. The
about the margin of the lake the first
~~No water was anywhere contained in the lake~~
plant was a lichen[#] which grew on
[no 170]

the formative ~~broken stones~~ ^{of the miniature}
beach. Next came a ^{broad strip of one of the} low grasswoods[#]
[#] *Atriplex confertifolia*
and one by one the ^{the} desert shrubs
followed. The creosote-bush was
the plant that, with the exception of
the yucca, held itself most remote
from the hard alkaline clay, and
showed its lower limit at an ^{abrupt} line
visible for miles across the valley-
bottom. Throughout ^{the greater part of} ~~most~~ of the
year these dry lakes retain the characters
^{noted} ^{above}, but if a heavy rain occurs
they ~~become~~ ^{become} covered with water, ~~to a~~
~~shallow depth~~ ^{which sinks into} and this percolates

~~into~~ the clay and softens it
~~through and softens the clay~~ so that ^{it} ~~it~~
~~the traversing road is~~ sometimes impassable for wagons.

I'm drying again after such a wet period, the clay does ^{not} crack.

From the bottom of Paradise Valley we continued northward again, rising toward the ~~next~~ ^{next} divide, and at night made a second dry camp ~~camped~~ about two miles south of Copper City Spring, the site of a ^{small} deserted mining settlement.

~~When camping~~
~~One accustomed to camp life in~~
a region where trees grass and water abound, one never ~~experiences~~ ^{has} the disagreeable experiences necessary to a dry camp in the desert. For the last two days we had had no water to use except ~~that~~ which was ~~that~~ brought with us, in ^{our two} barrels and ⁱⁿ canteens, from Daggett. ~~Distributed among the horses~~
~~camp~~ It was required ~~for~~ ^{drink} principally to drink, both for ourselves and for the animals; so

that little could be ~~shared~~ ^{shared} for 19
the other ~~uses~~ ^{uses} of the camp. ~~even for~~
~~Handwashing~~ ~~washing~~ ~~on~~ ~~hands~~ ~~and~~ ~~faces.~~

A dry camp ^{afterward} became, however, a frequent necessity with us.

Jan. 12, 1891. We continued along
~~and~~ ascending the divide and soon
reached Copper City Spring. ^{Mr. Palmer and} I had
ridden on in advance of the
party, and I ~~had~~ ^{could} improved the
opportunity of ascending the adja-
cent rocky hills and exam-
ining ^{its} ~~their~~ vegetation. I saw here
for the first time ^{one of the bra-}
merias [#], ~~and~~ ^{while} another shrub ^{##}, which
[#] R. canescens? ^{##} Coleogyne ramosissima

had been seen before only on the
^{high ground}
~~divide~~ between Victor and Baggett,
was abundant.

We crossed the divide above
Copper City Spring, ~~and~~ descended
its north slope, passing ^{on the way} a de-
serted ranch house, [#] and at a-
bout the middle of the afternoon

reached Granite Spring, ^{at the western base of Pilot Knob} Owing to ²⁰ several delays we had made only a very short day's journey. ~~From this point~~ ^{one of our temporary} ~~teamster~~ ^{which had been hired only temporarily} returned to Daggett ~~with his team~~

Jan. 13, 1891. We left Granite Spring and continued ^{around the northwest base of the mountain} downward into the valley lying to the north, ^{leaving above} ~~the edge of the valley as the~~ yuccas with the other plants that accompany them. ~~ceased on the~~ ^{western} ~~slope of Pilot Knob~~. The road then turned eastward for several miles, and again northward, passing over a peculiar line of low, strongly alkaline, gravel-covered clay hills into the south end of Parramint Valley, ^{and followed along the dry bed of a} ~~After travelling northward several~~ small stream ~~which~~ ^{the} course of which was northward. Late in the afternoon we reached Lone Willow Tanks, about twenty-five miles from

Granite ~~Spring~~ Spring. There we found
 Mr. Bailey ~~and~~ ^{and Mr. Dickman} Mr. Nelson, encamped
 with their cook and packer.

Jan. 14, 1891. I made a short trip
 with Mr. Bailey ^{in the morning} to the mouth of a
 small ~~to canyon~~ ^{ravine} about one-half mile

west of the tanks. The valley bot-
 tom ^{opposite Lone Willow Spring is} ~~is~~ characterized by

a growth of creosote-bush and
 white sage # with a few cactuses ##

Franseria dumosa ## Echinocactus polyceph-
alus, Opuntia echinocarpa, O.
basilaris.

while near the mouth of the ravine occurred
 a few other characteristic plants. # In the
~~place of~~ ^{place of} ~~the~~ ^{the} ~~original~~ ^{original}

Eucnide viridis, Lycium Andersonii, Ralea Fremontii

afternoon I went westward about a

mile up the mountain slope to the
~~original~~ ^{about 1000 ft. above camp,} ~~Lone Willow Spring~~ upper spring, #

collected a few plants on the rocky

slopes near by, there and followed

a ditch over the a low ridge below

to the original Lone Willow Spring.

A single willow tree ⁺, evidently planted,

makes the place and has given

* Salix laevigata.

rise to the name. The water of ²² the
~~it a an~~ upper spring, several years before our
visit, had been conducted in a iron
pipe to the lower spring and thence
down the ~~mountain side~~ ^{valley slope to} some ^{large} iron
tanks ~~to~~ ^{by} the roadside. The pipes were
now broken and the tanks empty,
so that we were obliged to haul
our water from the upper spring.

Jan. ¹⁵~~18~~, 1891. I remained in camp.

~~to-day~~ Jan. 16, 1891. I rode with Mr.
Bailey ~~eastward~~ ^{eastward} across the valley to
the foot of Brown's Peak, about six
miles from camp ~~at an altitude of~~
^{and at an altitude} ~~about~~ 500 ^{feet above it.} ~~ft.~~ ^{higher.} Here we tied
our horses and began the ascent
of the southwest slope of ~~the moun-~~
~~tain on foot.~~ The mountain side here
was steep and in many places
covered with "slide-rock." This
is the name ^{applied in many mountain regions} ~~given to~~ a bed of broken
rocks or stones situated on a
slope so steep ~~usually~~ ^{that they slide downward}

at a slight disturbance. The ²³ ~~beds~~ ^{commonly} ~~have a~~ surface slope ~~of~~ ^{commonly} of 30° to 35°, are devoid of vegetation, and are frequently situated on ^{such} very precipitous mountainsides ~~that~~ that they constitute the only practicable, ^{although always tiresome,} route for climbing. ~~At 2500 ft above camp we saw~~ Compared with the hard earth the first yuccas

The mountain vegetation varied ~~considerably~~ from that of the valley in the addition of several ^{new} shrubs. At 2000 ^{feet} ~~ft~~ above camp we came upon the first yuccas, and 450 ft higher we found a beautiful shrubby lupine [#] in flower. The summit

[#] *Lupinus mutus* [*L. exarbitus* DC. Aug. 18, 1937]

of the mountain was, ^{by the aneroid,} ~~about~~ ^{35-60 ft} above camp. ~~The summit~~ ^{which we had seen} yuccas, ~~rather~~ ^{closer} ~~than~~ ^{from the tanks} day with a glass. The scant ^{shrubby} vegetation ~~of shrubs~~ is similar

aspect and character to that of the ^{principally} desert below, but made up of different plants.[#]

Eurotia lanata, Lycium ^{cooperi} ~~eastlandicum~~, Mal-
vastrium [176], Eriogonum [177]

Thamnosma montanum, Grazia polygaloi-
des, Hymenoclea salsola, and Opuntia basib-
eris

Mr. Dikeman by a more circuitous route had reached the same point for topo-
graphic work. We piled up at the highest point a small monument of stones and placed in it a record of our names, our occupation, and the date.
From the summit descended

the north slope of the mountain about 600 feet, then turning westward joined Mr. Bailey again and came down the mountain through a cañon, ^{opening a little westward} ~~not far from~~ the point at which we began the ascent. In this cañon, on the south face of the mountain, the shrubs are bent up the slope, and indicate a strong prevailing south wind, while in another cañon ^{on the} north slope of the mountain, the shrubs are bent quite as strongly downward, in a northerly direction.

From the base of the mountain we returned to camp ~~by our back~~ following our trail backward across the valley.

Jan. 17. Mr. Funston and I set out on ~~horseback~~ ^{horseback} for Lone Willow Peak, a high point about eight miles southwest from Lone Willow Spring in the Slate Range. We followed an old wagon-road up the steep mesa westward from Lone Willow ^{passing} tanks ~~past~~ to the right of both the ~~up~~ lower and upper springs and entering the mouth of a cañon about a mile above. ~~and westward~~ ^{We followed} this cañon southwestward ~~from the upper~~ as far up into the mountains as the horses could be ridden, ^{and} staked them out to feed upon a bunch grass [#] ~~that~~ that grew there. This grass ^{is of frequent occurrence} ~~frequently occurs~~ in [#] Stipa viridula [S. speciosa F.V.C. Aug. 18, 1934]

the mountains throughout ^{at the lower} and may be expected, ~~at an~~ ^{on the rocky slopes} of mountains and in cañons, at an

altitude of 2000 feet, ~~and~~ ~~above~~ this height ~~it~~ well up into the ~~grass~~ ^{yuccas}.

It is a perennial and grows in tufts scattered so widely over the ground that ~~if left to~~ ^{a horse must} be hobbled instead of staked ~~when left~~ ^{to feed upon it for more than a} ~~half hour, must~~ ^{although having}

but few green leaves at this time, ~~it bears~~ ^{the} dried leaves and stems of the preceding ~~years~~ ^{seasons} growth, ~~and~~

~~The~~ The horses were very fond of it, and it ~~appeared~~ ~~to~~ ~~really~~ ~~to~~ furnished them considerable nourishment, apart from the grain they ate. During the ~~four~~ ^{four} days and three

nights between Paggett and Lone Willow tanks, ~~no~~ ^{no} grass ~~was~~ ^{had been} found for the horses, and they ~~were~~ ^{had been} fed only with the hay and grain that we had brought with us.

Having tied our horses, we continued up the cañon on foot nearly to its source and then as-

ascending a steep ridge to the right
 we were upon the shoulder of the
 mountain. I went about three
 miles farther upon the broken
 but ascending slope ~~to an altitude of~~ ^{feet} until I
~~ascertained the existence~~ of yuccas
 was found, but the summit of the
 peak ~~was still somewhat~~ higher.

The vegetation throughout ~~was very~~
 similar to ~~and~~ that on Browns Peak,
~~the same gradual~~

and presented the same successive
 changes at different altitudes.

We returned to camp by the
 same route. At ^{one point in} the cañon, a few
 miles from its mouth, there is
 a growth of cane[#] and other plants
[†]Phragmites ~~communis~~ ^{vulgaris}

indicative of a constant supply
 of water in the soil. ~~By digging~~

A spring could undoubtedly be found by digging.

Jan. 18. ~~Sunday~~ ^{in the afternoon} I made a trip on horse-back about half way ~~up~~ to the summit of Lone Willow Peak, by ~~the~~ nearly the same route followed on the preceding day but climbing the mountain proper along the hog-back west of the cañon described.

Jan. 19. We broke camp at Lone Willow tanks and ~~travelled~~ ^{set out} ~~continued~~ ^{north-} ~~ward~~ for Death Valley by the old borax road. It ~~lies~~ ^{extends} northward ~~a few miles~~ coinciding with the Panamint road for a few miles, then turns eastward across the valley-bottom, and ascending a ~~low~~ ^{broad} divide, ^{called Windy Gap,} north of Brown Peak, ~~descends~~ ^{descends} gradually northeastward toward Death Valley.

A few miles ~~below the summit~~ ^{below the summit} of this ²⁹
~~after several hours~~
divide, the valley narrows and the
road descends into a ~~narrow~~
rock-walled cañon. We kept on
down this cañon by moonlight un-
til ~~nine~~ ^{nine} o'clock at night, when we
~~made~~ made a dry camp ~~in the~~
upon the sand and gravel.
During the day we had been re-
minded of the country that lay
before us by passing a roadside
grave with the inscription on the
headboard, in pencil, "James Cole-
man. Buried by Homer Jones
June 16 1879", and another board,
at the fork ~~of~~ ^{of} ~~an~~ ^{an} old min-
ing road, bearing the legend "Tay-
lors Mine 16 miles to Hell".

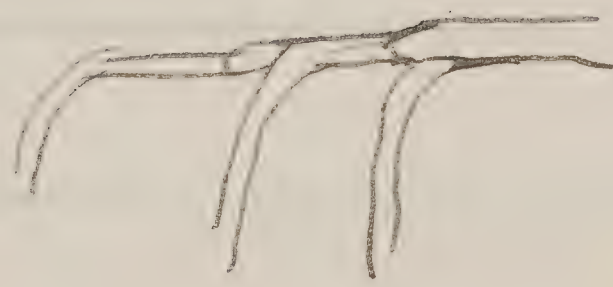
The excessive dryness of the re-
gion was evidenced by the fact that
the pencil-marks on the grave-
board, which had been twelve years
exposed to atmospheric effects,

~~was~~ still appeared clear and fresh, and the ^{surface of the} ~~wood itself~~ had retained its natural ^{appearance} ~~color~~ and not changed to the gray color of ^{weathered} ~~timber~~ timber.

In Windy Gap the bushes indicate a strong prevailing southwest wind.

Jan. 20. In the morning we continued down the cañon and soon emerged into ~~the south end of~~ Death Valley near the south end of its alkali flat ~~sink~~. On either side were high mountains and between ^{them} the narrow valley not more than ten miles wide from mountain to mountain. In the ~~very~~ bottom of the valley was the snow-white stretch of salt and alkali, and to the northward, perhaps fifty miles ^{away}, mountains, valleys and salt-flat vanished in ~~the~~ haze.

A few miles from the mouth of the cañon we passed ~~the~~



an old watering place called
Salt Wells. A hole about ^{twenty-five}~~eighty~~
feet deep had been dug in previous
years, and ~~at the~~ ^{from the} bottom, ~~we~~
drew up some water which was
found to be a nearly saturated
brine.

From Salt Wells we ~~we~~ continued
~~northward~~ along the west ~~slope~~
of the sink. Creosote-bush ~~can~~
been characteristic of all our route
until we neared the salt-marsh,
and but here, under the influence of
clay and alkali, it gave way
to a greasewood[#], that in turn to

[#] Atriplex polycarpa

salt-grass^{##} and finally to pickle-weed.^{###}

^{##} Distichlis spicata

^{###} Sperosetaceae occidentalis

Beyond this there was no vegeta-
tion whatever. The road however
~~did not~~ ^{continued} pass outside the limit of veg-
etation.

Allenrolfea

at about the middle of the afternoon
~~At about ten miles from~~
~~Toward evening we approached~~
 came within sight of ~~sight~~
 a large clump of mesquit ~~tree~~ [#] bushes
[#] *Prosopis juliflora*
 and a little further on we came
 upon another clump where we
 made a dry camp. Just before
 dark I walked out on the salt
 marsh. Near the margin the soil
 had the appearance of ^{an area} ~~an area~~
^{covered} ~~and~~ with ^{cow tracks} ~~half~~ obliterated and
 with a little fine snow in the
 hollows. Farther out the soil is
 moist smooth and covered by a
 filmy incrustation. At a distance
 of about a half-mile from the
 line of vegetation, I came upon
 a small stream of water, clear
 but almost saturated with salt.

The pickle-weed at this part of
 the valley grew in bunches about ^{which}
 the soil accumulated so as to
 form hummocks often three
 feet in height and several

feet across. In the mesquite clumps, which were in less alkaline ^{situations} ~~only~~ as similar ~~the same~~ banking of the soil had occurred. Dry sand blowing along over the ground had drifted ~~into the~~ under the bushes and ~~and~~ finally formed mounds often ten to fifteen feet high, out of which the ^{smaller} branches of the mesquite projected like ~~small~~ briars.

Jan. 21. After a few miles travel on the following morning, we came upon a ^{shallow} well ^{containing} ~~amber~~ colored water of disagreeable taste, ~~it is~~ ^{and} known as Mesquit Well. The mesquite clumps became now almost continuous. Early in the afternoon we reached Bennett Wells and went into camp with Mr. Bailey and Mr. Nelson who had ^{joined our party} ~~joined our party~~ walked out about a quarter-mile to the edge of the salt marsh, which is here very ~~hard~~ ^{hard} and rough.

Jan. 22, ~~th~~

I made a ^{short} trip westward from

Mr. Tinsley, who had gone from Lone Willow Valley to Bennett Wells, reached the mail and crossed the ~~mountain~~ ^{range} into Death Valley, reached Bennett Wells on the night of the twentieth.

~~The~~ camp to the ~~foot of the~~ gravelly mesa that slopes ^{gently} down from the foot of the Panamints, and returned to camp by a detour ^{northward} ~~northward~~ about through the mesquites.

Jan. 23 Mr. Bailey and I started on foot across the salt-marsh in a direction a little south of east from Bennett Wells, toward the mouth of a cañon in the Funeral Mountains. We counted our steps across the marsh and found the distance to be about five miles. Three or four stream-beds trending northward were crossed, but only one contained water, ^{located} ~~stagnant~~, in isolated pools, and saturated with salt. ^{Near these} ~~On the bank~~ pools grew a few ^{specimens of} ~~plants of~~ ~~Field~~ pickle-weed and [#]

[#] Suaeda suffrutescens

but otherwise no plant whatever ~~veget~~

was seen upon the march. 35-

At the mouth of the cañon
~~toward~~ which we had made our
objective point is a gravel slope
about a mile long bearing no
shrub ~~but~~ ^{except} one of the graserwoods.

Atriplex hymenelytra.
This cañon, a short distance from its mouth,
~~The first cañon~~

was obstructed by a perpendicular
wall of rock and we were ob-
liged to ~~follow~~ ^{turn} southward ^{two or three miles} along
the base of the mountain until we
came to ^{a pair} ~~two~~ of cañons ~~opening from~~
~~the~~ ^{opening} close together. We ascended
the northernmost of these till we
were again ~~stopped~~ ^{stopped} and then crossed
a low ridge into the other.

Proceeding a few miles up this ^{Cañon}
we camped for the night.

~~The~~ ^{The} mountain was rugged and
the vegetation although similar to
that of the ranges ~~that~~ ^{which} we had seen
before was much scantier.

Jan. 24. We retraced our route of the previous day to Bennett Wells.

Toward evening I rode ^{about} three miles north from Bennett Wells to the site of the ~~old abandoned~~ ^{now defunct} Eagle Borax Works. Here I saw for the first time a few trees of the screw bean[#].

Prosopis pubescens

At Bennett Wells there is a shallow well of excellent water, and plenty of mesquit ~~and two other~~ for fuel, and while fairly good ^{temporary feed} ~~grass~~ for the horses, ^{is afforded by a} ~~the grasses~~ bunch grass^{#2} which is a-

#2 Sporobolus airoides

abundant through the mesquites.

Jan. 25. ~~Sunday~~ I rode to the Eagle Borax Works again and spent a few hours investigating the alkaline swamp there. No large mesquites, ^{except one at the spring,} ~~except~~ were to be seen, although seedlings of a few years growth were abundant. The older ones had evi-

dently been cut for firewood.

The ~~principal~~ ~~growth~~ ^{vegetation} of the swamp, which covered several ~~acres~~ ^{acres}, is made up principally of the bunch grass common at Bennett Wells, salt ^{cane} ^{#2} ~~grasses~~, ^{yerba mansa} ^{#3}, two rushes, ^{#7}, and a few ~~several~~ ^{#5} sedges.

Distichlis spicata ^{#2} Phragmites communis
 # ³ Aeluropsis californica ^{#4} Juncus balticus
~~sp.~~ ~~maritima~~ ^{#5} Eleocharis rostellata, Scirpus la-
occidentalis occidentalis and S. maritimus [S. paludosus F.V.C. Aug. 18
 1934]

Jan. 26. I ~~followed~~ ^{set out on} the bray road
 to Furnace Creek. About ten miles
 north of Bennett Wells the road
 deviates eastward and crosses the
 salt marsh, then turns northward
 again and follows the east side
 of the valley to Furnace Creek
 ranch. Mr. Furston, who had gone
 to ^{this place} ~~Furnace~~ a few days before with
 another party of the Expedition, had
 been collecting specimens about the
 ranch and in Furnace Cr. Cañon.

In the afternoon I drove with Mr. Dayton, the superintendent of the ranch to the ~~now~~ unused ~~bank~~ plant of the Coleman Borax Works } about two miles north of the ranch. There is a grassy marsh similar to that of the Eagle Borax Works, and from its soil most of the raw borate[#] extracted at the works was obtained.

At Furnace Creek ranch was plenty of alfalfa and excellent water.

Jan. 27. I went from the ranch across the mesa and up Furnace Creek ~~canon~~ ^{these are slightly alkaline and have a temperature of 92.5° F.} as far as the springs. From this point down to the mouth of the canon, and on to the ranch is a ditch of water ~~adequately~~ ^{amplly} more than sufficient to irrigate the thirty acres ^{of alfalfa ~~cultivation~~}. The ~~water~~ ^{canon} is ~~here~~ ^{lined} by a growth of mesquite, screw bean, willow[#], cat-tail^{#2}, tule, and ^{#1} ~~other~~ ^{many} herbaceous plants.

Jan. 28. I rode back from ^{Furnace Creek to} Bennett's Wells in the forenoon, and remained at camp the rest of the day.

Jan. 29. We took an early breakfast by moonlight, ~~and after packing our outfit~~ preparatory to setting out ~~for~~ ^{for} Saratoga Springs at the south end of Death Valley. Having now to leave the freight wagon, we packed our outfit on ~~the~~ ^{two burros and} ~~backs~~ ^a mule, an operation which was at that time ~~rather~~ ^{very trying and unsatisfactory}, but which afterward became a constant necessity and an easy task. The party consisted of Mr. Bailey, Mr. Nelson, Mr. Dikeman and myself with a packer.

We retraced our route as far as Salt Wells, near the point where we entered the valley, and then turning to the left from the borax road continued in a southerly direction up the ~~valley~~ ^{bed} of the Amargosa. Many years before there

had been a road here, but it was now so ^{nearly} obliterated or obstructed by washes that we found it easier to follow the dry ^{and} often rough bed of the stream. At night we made a dry camp about four miles southeast of Salt Wells. We had packed a ~~small~~ ^{small} barrel of water for the horses, ~~but~~ they drank it very sparingly as it was tainted by ~~the~~ some soured ^{remnants of} wine in the cask. We fed them a little grain, but could not supply them with hay. ~~In~~ In their craving for food they ate ^{the herbage of} ~~the~~ greasewood and even the ~~Atriplex~~ ^{Atriplex} canescens, A. polycarpa, and Suaeda suffrutescens.

dry dead twigs of these plants and creosote-bush.

Jan. 30. We proceeded up the valley of the Amargosa, and shortly after

over midday lunch, ^{following an old road, 41} crossed some low foot-hills of the Funeral Mountains, ~~passing~~ ^{passing} a small dry lake situated among them, and at about dark reached Shoshone Springs. Here we found ~~me~~ a large warm spring, with a temperature of 82°F , and very disagreeably alkaline to the taste. The water from it forms a swamp several acres in extent with a ~~few~~ rather large areas of open water. The swamp grasses and sedges furnished food for our horses, and we shot ~~many~~ ^{several} ducks on the pond. With the exception of the water, we found the place quite satisfactory for camping.

Jan. 30. Most of the day was spent about the spring and swamp, and in the afternoon I rode ~~south~~ ^{west} across the valley bottom, at

a point where the Amargosa runs
nearest to Saratoga Springs. The
channels of the stream contains ^{here} a little
very alkaline water.

~~At night three cow-boys were camped at with
us on their way from Nevada to Los Angeles~~

Feb. 1, 1891, ~~Sunday~~ ~~At night our~~
Late in the afternoon our
teamster drove in from Daggett
by ~~the~~ ^{the} route with a load
of grain and provisions, and
with him came Mr. W. C. Burnett,
a reporter for the San Francisco
Examiner. Mr. Burnett had two
horses a wagon and a camping
outfit.

Feb. 2. I rode with Mr. Burnett
northwestward about four miles
along the foot of the moun-
tains and then ascended a
long ^{detrital} slope northward ^{for a few miles} into the
mountains, ^{passing on the way a mining shaft.} Turning to the left
~~we then entered a small side cañon~~
~~side of that~~ and, following it to near its
head, ascended a peak 3350 feet above
Saratoga Spring. ~~The~~ At this altitude

43

we were still within the belt of ^{Lumina},
~~there were~~ ~~or cactus~~ ~~belt~~ and no yucca was
anywhere seen.

In returning to camp after dark we lost our way in the mountains, but our horses with a fore rim, brought us safely into camp at about 9 o'clock.

Feb. 3. I remained at camp.

Feb. 4. In the afternoon I rode up the valley of the Amargosa a few miles to some immense sand-hills about 200 feet in height. They are composed of dry ~~They were~~ sand blown and drifted by the wind, and quite devoid of vegetation except near the base.

Feb. 5. In the morning I left Seratoga Springs alone on horseback and rode to Resting Springs. ~~The road passes~~ ~~from Seratoga~~ ~~up the slope of the mountains~~ ~~The road passes the box mine and~~ ~~southward~~ ~~along the foot of the moun-~~
tains two or three miles, and then turns

camped the night before at Amargosa borax works. We all went into camp by the spring on the deserted Mitchell ranch about a mile south of Resting Springs ranch.

In the afternoon I collected plants about our camping place and two or three miles eastward in a wash toward the Resting Spring. ~~A Mr. Black, who lived on a ranch near the stamp-mills, was looking after the property of the company mine.~~ The broad ~~Resting Springs~~ valley bottom where it opens into Amargosa Valley, ~~Feb. 7th~~ is made up of a deposit of clay strongly charged with alkaline matter. This deposit has been cut ~~down~~ up in most parts by little gullies containing scant vegetation, while the knolls themselves in most cases bear no vegetation whatever.

Feb. 7. In the morning I made a trip on foot southeast from camp, then around to the south and

back to camp from the southwest, all the territory covered being ^{composed of} the alpine clay described above and including one strip of moist soil.

In the afternoon ~~Mr. Bailey arrived~~ ^{the} party from Saratoga Springs arrived.

Feb. 8, ~~Sunday~~. I remained at camp. A hard wind blew all day making it exceedingly cold. The temperature at ~~one o'clock~~ ^{in the afternoon} was ~~48° F.~~ ^{only} 48° F.

Feb. 9. The night was unusually cold, the thermometer registering 80° F. at a quarter past six in the morning. I rode ~~on horseback~~ to the Resting Springs mine and ~~fast~~ it up a road in the cañon ~~at~~ south of ~~from~~ it to the summit of the ~~divide~~ in the Resting Springs Mountains; and then continued ^{up} foot up to the ~~summit~~ ^{top} of the black butte south of the pass, ~~at~~ a point 800 feet higher than our camp. I returned to camp by nearly

the same route.

In the afternoon I rode down the moist grassy wash in which our camp lay and through the edge of the broad meadows southwest of Resting Springs. ~~the basin in which this part of the valley of the Amazona Resting Springs Valley and creek~~ were some deserted houses that marked the location of ^{an} ~~some~~ apparently prosperous ranch. This is undoubtedly the spot on the old ~~the~~ Spanish trail, which Fremont referred to by its current name, the archilete! ~~See~~ The remains of irrigation ditches from this point

See Frem. Rep. Exped. 1892-4, ~~the~~ [insert page]

are still visible, and the area of ^{coarse} natural pasturage is probably ^{four or five} hundred acres. A screw-bean tree near one of the old house-walls measured, at about a meter from the base 1. m [5 ft 4 in] in circumference.

~~The south end of Resting Springs~~
~~valley~~ through which this part of the Amazona flows
 The basin of the Amazona at the foot of
 the Andes at the south ~~on a~~

range connecting the Funeral ⁷⁸ ~~Mount-~~
~~range of mountains~~
ains on the west with the Resting
Springs Mountains on the east.
Through this transverse range a
~~deep channel has been cut~~
canyon now exists by which the
valley is drained and through
which the Amargosa River
flows. I rode a short distance
into the mouth of the cañon
and then climbed its ~~west~~ east wall.
~~slope~~ At this point there ~~cañon~~
~~bank~~ ~~are~~ ~~formed~~ by is a deposit
of gravel ^{two or} ~~three or four~~ hundred
feet in thickness. I rode back
to camp over the mesa east of
the valley bottom.

Feb. 10. A party composed of Mr. Pal-
mer, Mr. Nelson, ^{Mr. Funston,} Mr. Burnett and myself,
~~with Mike and Tim~~ set out for Pah-
rump ranch. We followed the road
northward up the gradual slope
of Resting Springs Valley and at

night camped at Twelve Mile Spring.

Feb. 11. The party continued northward up the sloping valley bottom and after a few miles travel we came to the summit of the divide between ^{Restings Spring} ~~this valley~~ and Pahroump Valleys. I had meanwhile ridden westward from our camping place into the center of the valley. The soil was of clay and bore no creosote-bush, but was characterized by ^{knives} ~~specimens~~ of grease-wood, and about the margins of the clay deposits ~~some mesquites appeared~~ mesquite occurred, and the gravel slopes of the valley ^{sustained an abundant growth of} ~~had~~ creosote-bush. —

A few miles north of the summit of the divide, the road ~~and crosses the Nevada~~ turns eastward ~~across the Nevada~~ and crossing the Nevada line, enters the broad level bottom of Pahroump Valley. ^{Late in the} ~~At nearly~~ afternoon we reached

Pahump ranch on the eastern side
of the valley bottom, ~~and at the west~~
~~foot of the Charleston Mountains~~

Feb. 12. Early in the morning we
set out for Clarke's saw-mill ^{situated} in
the yellow pine timber ^{on the western}
slope of the Charleston Mountains
and north of Charleston Peak. At
the ^{height} ~~altitude~~ of only 1500 ft above
the ranch, which is about 2000
feet above sea-level, ~~we began to~~
~~see the tree yuccas~~ ~~we began to~~
~~the smaller tree yuccas appear.~~ The

Yucca baccata and Y. brevifolia

Last that we had seen being on
the Slate Range, west of Lone Willow
Spring. At 5200 ft above sea level
the first junipers ^{#2} appeared and at

#2 Juniperus californica utahensis

about ⁵⁵⁰⁰ ~~5400~~ ft became abundant.

At 6100 ~~the nut pine~~ ^{#3} began, at 7500 the

yellow pine ^{#4} accompanied a few hundred

#3 Pinus monophylla #4 Pinus ponderosa scopulorum

feet higher by the white fir!

51

Abies concolor

Owing to the depth of the snow we were unable to reach the saw-mill but camped about a mile below it at an altitude of about 8350 ft. For water, we melted snow, and with the abundance of firewood in the forest we kept pretty warm. The temperature at half past nine in the evening was 14°F .

Feb. 13. After breakfast we took our horses through the snow up to the mill and watered them. Mr. Palmer and I ^{then} ~~went~~ continued on foot up the slope north of the saw-mill to the summit of a ridge at an altitude of 9600 feet and then still northward to another ridge of 10,000 feet altitude. At this ~~highest~~ point the characteristic tree is the ~~poplar~~ ^{bristle-cone} pine, which is ac-
Pinus aristata

52.

accompanied by ~~the white~~ pine. We re-
Pinus flexilis

turned to camp, ~~for~~ descending some-
what farther westward, ~~on~~ by the same
slope ~~by~~ which we came up.

Feb. 14. The entire party returned
to ~~Bar~~ Pahump ranch where we re-
mained for two days.

~~Feb. 15. I remained at camp.~~

~~Feb. 16. It was raining nearly
all day, and we did not start
for Resting Springs as was ex-
pected.~~

Feb. 17. We returned to Resting
Springs by the same ~~road~~ route on which
we had gone to Pahump ranch. ^{During our}
Frank Stephens ~~had joined the party at Resting Springs.~~ ^{absence Mr.}

Feb. 18. It rained all day, and
I remained in camp.

Feb. 19. The Expedition had received
no mail for about four weeks
past, and Mr. Funston and I vol-
unteered to make the trip to
Panamint for it. As some topo-
graphical work still remained

to be done in the Funeral Mountains, a party was made up of Mr. Bailey, Mr. Dikeman, Mr. Function and myself with a packer, and we set out \pm about an hour before noon, ~~for a point in those mountains west of Amargosa~~
~~pony works~~

We crossed the valley of the Amargosa and went southward a few miles on the road toward Saratoga Springs. Then turning westward we passed up a shallow ~~canyon~~ ^{arroyo} in the mesa, and soon emerging from this traversed the mesa itself, going a little north of west, until ~~we~~ we reached the mouth of a cañon ~~in the mountains~~ ^{Amargosa} ~~the same work~~ ~~Amargosa~~ ~~pony~~ We traversed this ^(climbing around one dry fall) cañon for several miles, nearly to the summit of the

57

mountains and camped at a small
but excellent ~~known as Mesquit Spring,~~
spring, in a short side cañon
about 2000 feet higher than the
Amarogosa
range.

I proceeded on foot up the
cañon to the summit of the
divide, about 250 higher than camp.
~~and from~~ ^{from} that point could be
seen the Panamint range stretch-
ing up above the western ridge
of the Funeral Mountains. At dark
I ~~retreated to camp~~
~~reached camp again.~~

Feb. 20. Mr. Funston and I went
from camp to the summit of
the peak south of the divide above
us, a point 900 feet higher than our
camp. On the north slope of this peak
is a small area which is
just above the upper limit of the
creosote bush, but no yuccas
~~The peak that we ascended Feb. 2 lies south 25° west~~
~~from this point.~~ In the afternoon we
collected down the cañon, about

a mile below camp.

Feb. 21. Mr. Furston and I taking our blankets and ~~about three days~~ ^{a small amount of} provisions set out on horseback westward over the divide and down over a broad sloping wash ^{from} which we emerged into ~~the~~ ^{Death} Valley ~~of the Amargosa~~ about eight miles south-east of Salt Wells. We continued northward ~~and~~ followed the wagon road ^{as far as} passing Salt Wells, ~~and~~ Mesquit Well, and then turned westward across the mesa toward the mouth of Johnson Cañon in the Panamint Mountains. After leaving Mesquit Well there was no trail and the mesa was ^{very} rough with boulders and ~~deep~~ ^{steep} ~~draws~~ ^{gullies} washes often 70 feet in depth. In one of these we ^{made a dry camp} ~~camped~~ at dark.

Rain had begun to fall ~~here~~ ^{again} after we left Salt Wells, and before nightfall ~~with~~ a steady drizzle had set in.

Feb. 22 ~~Thursday~~. We ~~proceeded~~ ^{continued} in

a hard rain to the the mouth of Johnson
 cany, and rode or walked several
 miles up it to ~~the~~ ^a place which we came
 afterward to know as Pete's garden,
 a ~~bit~~ ^{rich} bit of ground cultivated ~~in~~
 summer by a Panamint Indian
 named Pete, but ~~now~~ ^{at this season} deserted.

We found here a few square
 rods of growing alfalfa where we
 staked our horses; ~~and~~ ^{at about this alt.} and ^{in the afternoon}
~~then~~ we proceeded on foot toward the
 pass. Pete's garden lies at the alti-
 tude of about feet, at the lower
 edge of timber. From this point
 upward snow, instead of rain, had
 fallen, and as we were nearly
 wet through ~~to~~ ^{the rain on the moun-} with ~~the~~ ^{all day}
 rain-side below, ~~and weak from overex-~~
~~tion and lack of sufficient~~
~~lack of sufficient~~ food
 rushed down the cany made the
 ascent a difficult one. After a
 climb of about a mile and a

half we lost the trail in ^{knee-deep} the snow, and ~~on account~~ ^{because} of the clouds that hung about ^{the mountain} ~~us~~ we could not tell up which branch of the cañon the pass might be. Exhausted and chilled we returned to the wicki-up or brush house at Pete's garden, and there passed a miserable night. Torrents of rain ~~fell~~ ^{flew} down, penetrating the ~~thick~~ ^{flimsy} structure in which we were, and ~~soon~~ soaking our ^{bed} blankets, while outside the wind went down the cañon all night in howling whirle.

Feb. 23. Our food supply was almost exhausted, and the cañon was filled with a rushing stream of water that would prevent our ~~going~~ ^{riding} down it, while ^{higher up} the mountains were ~~obscured~~ ^{hidden} in clouds. At about one o'clock

in the afternoon however we attempted a second time to make the pass. We lost the trail as before and climbed up the steep mountain ~~slopeside~~ as best we could. The snow became three feet and more in depth but at the higher elevations we were assisted by a crust sufficiently thick to hold us up ~~if~~ if we crawled. The slope ~~was~~ ^{was} at an angle of ~~about~~ thirty to thirty-five degrees and exhausted as we were from exposure and lack of food it was only with the greatest difficulty that we reached the summit. We had ~~been~~ ^{been} unable to make out the lowest gap in the crest of the mountain, ~~pass among the craters~~ and had crossed the summit about a half-mile north of the pass, at the foot of a small ab-

The altitude of this point is nearly 9000 feet.
ruff rocky butte. } We descended the ⁵⁷⁴
~~east~~ ^{west} slope of the mountains about
two ~~miles~~ ^{nearly deserted old mining} and a half miles to
the town of Panamint.

Feb. 24. The storm continued in
the form of cold wind and
sleet, and we remained at Pana-
mint. ~~all day~~ Three gentlemen,
Messrs Decker, Fairman, and Wall,
who were looking after mining
property ~~at~~ in the vicinity, gave
us a most cordial welcome,
and made our stay at Panamint, ~~after~~
~~with the comforts of civilized life.~~
the rough ^{trip over the} mountains ~~trip~~, very
pleasant.

Feb. 25. Packing our accumu-
lated mail in two ^{bags} ~~chests~~, and
tying our feet in gunny-sacking,
we made the return trip to
Peter's garden, Mr. Decker kindly
accompanying us to the sum-
mit of the pass. Taking our

horses from the alfalfa patch
 we rode down the cañon and
 at about eight o'clock, reached
 Bennett Wells. ^{(In going down} ~~the~~ ^{the} moun-
 P ~~Feb. 26. We rode from Bennett~~
~~tain-side we could see some of the~~
~~Wells~~ effects of the storm. The ^{dry} washes
~~in the sloping mesa, had~~
~~been changed ^{to} ~~into~~ ^{water} ~~torrents~~ ^{precipitous}~~
~~streams, while the salt marsh of~~
~~Death Valley was more than one-half~~
~~covered with water. The ~~effect of water~~ ~~was~~~~
~~the same.~~ The ^{wash-outs} ~~washes~~ along the borax
 road in the southern part of the valley
 showed greater denudation from this
 one storm than from the combined
 effect of all the rains since ^{the year} 1886, when
 the road ceased to be used for freighting.

Feb. 26. We went from Bennett
 Wells to Furnace Creek ranch. ~~to~~

Feb. 27. Starting late in the fore-
 noon, we rode southeast up the cañon
 of Furnace Creek about nine miles.

and camped in a cleft in the
 rocks, on the north side of the
 cañon, at a point known ~~either~~
 as Mountain Spring ~~and~~ Twelve Mile
 Spring. ^{names used also for other points visited by the}
~~Both of these names apply~~
~~to other springs~~ Expedition

Between the Furnace Creek springs and
 our camping place there ^{was} ~~it~~ no water
 except one very alkaline spring about
 one mile below the latter point.

Feb. 28. We left Mountain Spring
 early in the morning ^{(and about 1 mile above our}
^{camping place)} ~~turning~~
 northward out of Furnace Creek ~~cañon~~
 into a branch cañon which soon
 bent around eastward toward the
 divide between Death Valley and Amar-
 gosa Valley. This we followed, and
 passing over the summit descended
 on the east slope, ~~and~~ ^{late in the} ~~crossed~~
~~afternoon~~ ^{reaching} ~~reached~~ Ash Meadows ranch.
 One party of the Expedition had al-
 ready ^{arrived} ~~reached~~ there.

Mar. 1, 1891, ~~to-day~~ I remained in
Camp. ~~to-day~~

Mar. 2. I made a short trip on
foot ~~westward~~ from the ranch and
through the ^{neighboring} ~~about the~~ sand-hills. In the
afternoon Mr. Burnett and I rode
eastward from camp about two
miles to a place called the Devil's
~~spring in the~~
Hole, a deep cleft in the ^{foot-hill} rocks, at
~~the foot of some low mountains, filled~~
at the bottom of which a ^{large} warm
spring arose but had no sur-
face drainage.

Southward from the Devil's Hole about
a half-mile we came upon a
moist calcareous and alkaline
swamp in the dry gravelly mesa.
From this point we returned to
the ranch.

Mar. ³ ~~1891~~. I rode westward across
the valley, passing over the same
ground by which Mr. Funston and

I had entered Ash Meadows, namely the alkaline natural pasture of the ranch, the mesquit-covered sand-hills, ~~the~~ Ash Meadows Creek, Amargosa River, and the "self-rising" ground^{III} adjoining them. The latter name is applied to loose alkaline soil which is water-soaked ~~at~~ ^{at rainy} periods, ~~and at such~~ ^{but} which times ~~apparently~~ ^{apparently} an effervescence takes place throughout the mass. During the remainder of the season the moisture is dried out, ^{for a few feet on the surface at least,} and the soil is powdery and fluffy so that a horse ~~sinks in~~ ^{can sink in} it as in a bog. It is almost entirely devoid of vegetation.

I returned to camp by the same route.

Mar. 4. A party consisting of Mr. Bailey, Mr. Nelson, and myself

started with a ~~few~~^{team} buckboard⁶⁴ and
one saddle-horse on a trip
farther eastward into Nevada.
On this day we took the di-
rect road from Ash Meadows to
Pahrump passing over the
divide between the two valleys
at an altitude of about 800 feet
above Ash Meadows ranch.

Mar. 5. We left ~~Ash Meadows~~^{Pahrump}
ranch taking the ^{direct} road toward the
Vegas ~~as~~^{the principal} ranch in ~~the~~ Vegas
Valley is called. We travelled ~~all~~
~~day southward over~~
~~the mesa of Death~~

^ southward ~~to~~ past Gount's ranch,
~~nine mile spring followed Twelve mile spring; then~~
~~and then the road~~ by a wide
^ detour ~~followed the road~~ about to the eastward
up the ~~sloping~~ mesa of
the western slope of the Charlestone,
and at night ~~made a dry camp~~
in the yuccas about 400 feet

higher than Pahrump.

Mar. 6. We continued up the slope, ~~the~~ ^{toward the} mountain proper, and at an altitude of 5000 feet came upon the first juniper. After ~~another~~ ^a rise of a further rise of 200 feet we found the Nevada nut pine ~~upon the pines~~. Early in the afternoon we camped at Mountain Spring in the pass just north of Orell Peak, at an altitude of about 5900 ^{feet} ~~ft.~~, among the ~~pines~~ ^{nut pines}. A notable feature of the vegetation of this pass is the abundance of a small mesquite, ~~and~~ ^{the} ~~Agave utahensis~~.

* Agave utahensis

the pits in which it had been cooked by the Indians ~~being~~ ^{being} ~~scattered~~ ^{frequently} found the vicinity.

Mar. 7. The ~~day~~ ^{night} was ~~very~~ ^{very} cold and at fifteen minutes before six in the morning the mercury stood at 12° F. We broke camp

~~at~~

We went on over the divide, which is very little higher than the spring, and descended the east ~~slope~~^{sides} of the mountains. No conifers except the juniper and ~~fir~~^{nut pine} were seen on the slopes north and south of the pass. Early in the afternoon we reached Cottonwood ~~ranch~~^{Spring}, a deserted piece of property now deserted but ^{with an excellent spring of water.} ~~still provided with a good spring~~

Mar. 8, ~~Sunday~~. We remained at Cottonwood ~~ranch~~^{Spring}. ~~and~~

Mar. 9. We ~~left~~^{set out} eastward and soon came through some low hills into the broad Vegas Valley. Still travelling eastward toward the center of the valley, ~~we arrived~~^{and} a little after noon ~~we~~^{we} reached the ^{first} springs of Vegas ranch and camped there. In the evening I rode down to the ranch, about three miles distant, and returned again to camp.

> Mar. 10. ~~We moved~~^{We moved} camp in the

morning down to Vegas ranch and
 Mr. Nelson and I set out on
 horseback, with our beds and provision
 southward down the valley ~~to~~
 about eight miles on the road
 * to El Dorado, and then turned
 eastward down the Vegas Wash.
 For the first eight miles the wash
~~is~~ contains some water, and
 at the end of that portion is
 rendered impassible by logs.
 We ascended the cliffs on the
 south bank of the cañon and
 after riding over them for about a
 mile descended to the cañon's
 bottom. Within ~~a few~~ miles the
 water disappeared, and the re-
 mainder of the trip was on a
 hard dry stream bed. We went
 into camp on the high sandy
 bank of the Colorado River, just
 north of the mouth of the Vegas
 Wash, at a point ~~just~~ below the
 Grand Cañon and above Black Cañon

Mar. 11. I spent the day collecting plants about the camp and up the wash about a mile. The sandy bank of the river is overgrown with greasewood[#] and the adjacent gravelly hill Atriplex lentiformis

slopes have their customary covering of creosote-bush. The altitude of the place is only about ~~1000~~ feet.

Mar. 12. We started ^{late} in the morning from ~~the~~ our camp on the Colorado, and retraced our route of ~~March~~ ^{the second day previous} about 12 miles. ~~But~~ ^{For most of this} ~~portion~~ of this distance I was obliged to walk as one of our horses had broken his hobbles and left us on the ^{preceding} evening. But we ~~found~~ found him feeding at the logs in the wash when we came up. We camped at night on the meadow near the head of the wash a few miles ~~west~~ ^{east} of the El Dorado road.

Mar. 3. We started early in the ~~morning~~ and reached Vegas ranch at about ~~10~~ ⁹ o'clock in the morning, where Mr. Bailey had been collecting ~~for~~ during our absence.

Mar. 14. We all set out ~~once~~ northward up Vegas Valley and after travelling all day on the road toward Towners' ranch we went into camp ~~at night~~ at Corn Creek, a roadside spring where a small patch of ground had been once cultivated.

Mar. 15, ~~Sunday~~. We broke camp late in the forenoon, ~~and~~ proceeding ^{still} northward, and ~~at~~ just before dark reached ~~the~~ Towners' ranch.

~~The valley~~ Vegas Valley lies east of the Charleston Mountains and extends from near Towners' southward about fifty miles to the head of the Vegas Wash, through which it

once drained
~~finds~~ ~~settled~~ into the Colorado. ⁷⁹
On the east it is bordered by
gradually rising low mountain ranges,
some of which toward the northern
end of the ^{nut pine} valley are high enough
to bear ~~timber~~ and to be snow-
covered in winter.

Mar. 16. We left Towners ranch
early and followed the road
northward and afterward westward
up the slope of the valley ~~toward~~
and over the divide ^{at the north end of the Cheyenne Mts} between
Vegas Valley and ~~the valley of the Snake~~
~~Valley~~ The mesas and the foot-
hills of the mountains in the
vicinity of Towners are compar-
atively well supplied with grass
particularly a kind called #

Hilaria Jamesii

The range is so stony, however, and
the ^{springs} ~~surface~~ of water so few and
widely scattered that the cattle
wear their hoofs to the quick

in ^{reaching} ~~getting~~ to food and water. 71

The divide over which we passed was so low as to be covered only by yuccas. We continued westward and then southwestward ~~down~~ through mountains and foothills and at last ~~late~~ at about nine o'clock ^{at night} we reached ^{Watkins' ranch at} Ash Meadows, ~~by way of~~ having travelled, by the odometer, forty-nine miles.

Mar. 17 to 20. I remained in camp at Ash Meadows, ^{visiting various points in the vicinity} Our freight wagon had been delayed, and only through the kindness of Mr. Watkins were we able to make out an ~~adequate~~ ^{adequate} course of camp fare.

Mr. Furston had left Ash Meadows a few days before to go to Panamint, by way of Furnace Creek, for the mail.

On the 18th ~~Mar. 18~~ Mr. Palmer returned

from Daggett ~~to day~~ with a load of provisions.

~~Mar. 19. I remained at camp ~~the~~ day.~~

~~Mar. 20. In the morning Mr. Burnett and I went to the Devil's Hole.~~

Mar. 21. We broke camp at Ash Meadows and took the road to Furnace Creek, ~~retracing~~ ~~using~~ the route over which Mr. Furston and I had come on the twenty-eighth of February, making a dry camp at night a few miles ~~not~~ east of the divide in the Funeral Mountains.

Mar. 22, ~~Sunday~~. We reached Furnace Creek ranch at ~~about~~ sunset, and found Mr. Furston there with the mail. He had attempted first to reach Panamint by crossing the Panamint Mountains at a point northwest from Furnace Creek, but having become lost

among the foot-hills, ~~and having been~~⁷³
~~for out for two days~~ and being in
a serious plight for want of
food and water, he had returned
to Furnace Creek. He started again
by way of Bennett Wells and
Panamint Pass and, the snow
having largely disappeared, made
the trip without ~~great~~^{danger} ~~discom-~~
~~fort.~~ Mar. 23. He remained ~~in camp.~~
at Furnace Creek ~~occupied in packing up~~
~~Furnace Creek ranch.~~

Mar. 24. We left Furnace
Creek ~~ranch~~, ~~taking~~ took the bray
road south to Bennett Wells.
The Death Valley ^{spring} vegetation was at this
~~time~~^{season} coming into its fullest
display. Most of the mesquite
were leafed out, creosote bush
was in ~~full~~ flower, and beside
most of the annual plants and
many of the shrubs. In some
parts the mesa, at a little dis-
tance, appeared yellow for over

an extent of many acres from the ⁷⁴
~~many~~ flowering of one of the desert sun flow-
ers[#]

#Eucelia eriocephala

Mar. 25. We left Bennett Wells
~~and proceeding~~ southward about two
miles on the bray road and then
turning westward we went over the sloping
mesa to the mouth of Johnson Cañon.
Here the wagon was let down the
south bank of the ^{deep} ~~cañon~~ wash, ^{with ropes} and
we ~~again~~ ^{continued up} the cañon four or five
miles until darkness came on and
the horses ~~were in addition~~ were exhausted
from ^{long pull} ~~over boulders and rough~~
~~their boulder filled cañon bottom.~~
~~up hill~~ over boulder-covered ground. About
a mile above we came upon the
first spring at a point known
as the lower Indian garden, but
not at that time occupied. Here we
camped.

Mar. 26. We went on up the
cañon past the Indian gardens, where

95-

two families of ^{Panamint} Indians were living, and camped at the beginning of the junipers about a hundred yards above the spring that waters Peter's garden.

Mr. Funston and I went on foot over the ~~Pass~~ pass to Panamint and returned before night with the mail.

Mar. 27.⁴²⁸ Mr. Funston and I collected plants ~~for a portion of the day~~ in the vicinity of the ~~Indian gardens~~ camp, and attended to the ~~specimens already~~ ~~plants already~~ accumulated in the presses.

~~Mar. 28~~

~~Did not go from camp~~

Mar. 29, ~~Sunday~~. Mr. Funston and I ~~went~~ ^{walked} to Panamint for the mail, ^{which} ~~it~~ arrives but once a week, on Sundays, and is brought from ~~by~~ ^{from} Darwin, the nearest stage station, on horseback. I returned to camp in the afternoon.

Mar. 30. I spent the day collecting

in the vicinity of Pete's garden both in the bottom of the cañon and on its north bank to the height of about three hundred feet above the wicky-ups.

Mar. 31. Mr. Funston and I collected down the cañon for the distance of about a mile from camp.

Apr. ~~1~~¹⁸⁹¹, Mr. Nelson, Dr. Fisher, Mr. Burnett, and I with two pack burros and a horse went up the cañon to a spring about a half-mile above camp, and from that point ascended the mountain slope to the north, past a deserted wicky-up, and up to the summit of a hog-back in the ~~pinons~~^{nut pines}, at the east foot of a small black butte lying about a mile by, ~~an air line~~^{an air line}, northeast from Panamint Pass. Here, where the snow on north slopes lay still unmelted, at an altitude of about 2200 feet above Pete's garden, we arranged our camp for the night.

Apr. 2. We climbed up the rocky mostly snow-covered ridge toward the crest of the Panamints, passing through a belt of mountain mahogany and ~~Californian~~ ^{western} ~~mountain~~ juniper, #
Juniperus occidentalis ~~macrocarpa~~ ^{macrocarpa} ~~stenocarpa~~.

and meeting on north slopes with two pines. #2 { We reached the mountain crest at an alti-

#2 Pinus flexilis and P. aristata

tude of about feet. This we followed northward ^{as few miles} over rocks and deep but frozen snow-drifts to the summit of a peak having an altitude of about feet.

From this point we could see Telescope Peak ^{about three miles} ~~about three~~ farther northward. It was so late ^{in the afternoon} ~~at night~~ and we were so fatigued with climbing at these altitudes that we could not reach Telescope Peak and return to our blankets and food before night. ^{the snow here quite covered the} The surface of the ground ~~here was~~ ~~the~~

~~ridge covered with snow except~~⁷⁸
~~except~~ over small areas ^{sloping southward} where ~~it was~~
it had been partially blown and
and partially melted away. We re-
turned by the same route to our
sleeping place of the night pre-
vious, and by starlight con-
tinued down the mountain
side to the camp in Johnson
Canyon.

Mr. Furston had collected during
the day down the cañon to a
distance of about two miles below
camp.

April 3⁹⁴. ~~I remained in~~
~~camp~~ Mr. Furston ^{and I} collected in
the cañon above ^{and below} camp.

~~April 4. Mr. Furston and I~~
~~went collecting down the cañon~~
~~nearly to the lower Indian~~
~~garden.~~

April 5, ~~Sunday~~. Mr. Furston
and I went to Panamint, and

remained over night.

79

April 6. We returned to camp in the morning, and I walked ^{down the mountain} with the mail, to Bennett Wells, ~~at the bottom of Death Valley,~~ where I found Mr. Bailey camped alone. I did not reach there until an hour or more after ~~Bennett Wells~~

dark. A high wind from the south was blowing and after I reached the borax road I was ^{half tripped} ~~helped~~ along in clouds of dust and whirling sand.

April 7. I rode to Furnace Creek finding there ~~Mr. Dayton, Mr. Beyer~~ ~~Mr. Dayton~~ Mr. Dikeman and his packer, and Mr. Burnett. In the afternoon I went up Furnace Creek Cañon ~~and~~ ^{a mile} or more collecting plants.

Apr. 8. ~~The~~ In the morning I went again up Furnace Creek Cañon nearly to the springs, and returned at about noon. Mr. Stevens

had come in from Mesquite Valley, the northern arm of Death Valley, after a rough trip from Ash Meadows by way of Grapevine Mountain.

In the afternoon I returned to Bennett Wells, where I found Dr. Merriam and his outfit. He had just reached Death Valley from Daggett. Mr. Koebel and Mr. Rich accompanied him.

April 9. Mr. Dikeman and I went up to the camp in Johnson Cañon from which I had come on the sixth of April.

~~During my absence Mr. Funston~~
~~Mr. Funston had~~
had been collecting plants in the vicinity of the camp.

April 10. I ^{worked upon the plants collected in} ~~the last few days~~ ~~remained in camp,~~
while Mr. Funston collected in the cañon near camp.

April 11. We ~~all left the~~ broke camp ~~at~~ in Johnson cañon, and packed over the summit ^{of the mountains} to the town of Panamint,

~~and camped~~ ^{camping} at Brewery Spring in Surprise Cañon about two miles below, ~~the~~ Apr. 12, ~~Sunday~~. In the morning I remained in camp, and in the afternoon went to Panamint for the mail.

We collected in the ~~the~~ Surprise Cañon, as far down as the ~~the~~ old toll house, ~~collecting~~ ^{Apr. 13 to 15} ~~down the cañon a mile~~ ~~more, while I remained near~~ ~~the camp~~ and nearly as far up as Panamint.

~~Apr. 14. We collected down the cañon as far as the old Toll House.~~

~~Apr. 15. We collected up the cañon nearly as far as Panamint, among the lowest junipers.~~

Apr. 16. Mr. Trunston and I left the Brewery Spring camp with our outfit and went down the cañon ~~to~~ ^{to} Hot Springs. ~~Here we found a small party of the expedition already springing the bottom of Panamint encamped.~~ ~~Tally at the west base of the~~ ~~Mr. Keeble and Mr. Koch already encamped.~~

Apr. 17. I collected about camp and on the mesa at the mouth of Halls Cañon about a mile north from our camp. Three families of Panamint Indians lived near the mouth of this cañon and cultivated ~~the~~ a few acres of soil, irrigating it ~~from~~ ~~the~~ a small stream of water that flows from the cañon.

Apr. 18. Mr. Koebel, Mr. Furston, and I went collecting ~~up~~ to the mouth of Halls Cañon and a few hundred yards into it.

Apr. 19, ~~Sunday~~. I ~~remained~~ ^{went to} Panamint for the mail, returning in the afternoon to the Brewery Spring.

Apr. 20. I returned to the Hot Springs camp, and found that Dr. Merriam, Mr. Bailey, and Mr. Stevens had already reached there. I remained in camp, arranging our outfit and preparing plants for ship-

[ment.]

(Koebele?)

83

Apr. ~~20~~ 21. Mr. Funston and I went collecting up Surprise Cañon to the first spring, about 1200 feet above the cañon mouth.

Apr. ~~21~~ 22⁴²³ I remained in camp ~~for making preparations for~~
~~Apr. 23 I remained in camp~~
awaiting the completion of directions for future work.

Apr. 24. The camp at Hot Springs was broken up, one party setting out ~~to~~ for Lone Willow spring en route to southern Utah, another to Shepherd's Cañon on their way to Owens Valley. I took the ~~southern~~ ^{five or six miles} road ~~across~~ ^{then} Panamint Valley and over the Slate Range into Searles Valley where I spent the night at ~~the~~ ^{Searles' borax} ~~house of~~ borax works.

Apr. 25. I left Searles in the morning, on the road to Mohave, and passed the night at the summit station of the ~~Searles~~ borax company.

Apr. 26. I ~~set out early in the~~ ~~road from summit~~ ^{morning} ~~at~~ and reached Mohave, on the Southern Pacific Railroad, at sunset,

after a ride of fifty ~~three~~^{one} miles.

~~About ^{fifteen} twelve miles~~

From this time I was absent from official duty until the evening of May 9,¹⁸⁹¹ at which time I took the stage from ~~the~~ Mohave en route to Keeler ^{in Inyo County,} ~~Calif.~~
~~Calif.~~

~~May 10, 1891~~^{May 10, 1891} ~~The~~ The stage reached Red Rock Station at about two o'clock in the morning and there we changed horses and took a cup of coffee. At about nine o'clock we reached Indian Wells, ~~station~~ where we ~~took~~ breakfasted and changed both horses and driver. At about six o'clock in the evening we came to Hasvee Meadows, and made the third change of horses. A good supper was served to us there. We did not reach Keeler until an hour and a half after midnight, the stage-ride covering twenty-nine and a

half hours' ride

May 11, ~~1897~~ ~~1897~~ Sergeant A. E. Wilkinson, U. S. Signal Officer at Keeler, with the greatest kindness, placed at my disposal the office facilities of the Signal Station. For this and for ~~much~~ ^{much} other ~~favor~~ ^{assistance} in hearty cooperation with ~~the~~ its work, ~~of the Survey~~ the greatest obligations to Sergeant Wilkinson.

May 12^{to 15} ~~I remained at Keeler.~~

May 13. ~~I remained at Keeler.~~

May 14. ~~I stayed at Keeler, making~~ ~~made at~~ ~~collecting~~ ~~collections~~ ~~on~~ the mesa ~~west~~ east of Keeler at the west foot of ~~the~~ Cerro Gordo Mountain, and

May 15. ~~I collected~~ along the shore of Owens Lake ~~about a mile~~ northwestward from ^{the} town, ~~and~~ ~~turned by~~ ~~detour~~ ~~to the east~~ ~~through the~~ and in the adjacent sand-hills and ~~mesa~~ ^{mesa}. ~~the mesa~~ ^{about}

May 16. I drove to Swansea, ~~at~~ ^{about} the three miles north of Keeler, at the

foot of the Inyo ~~Range~~ range, and from that point along the ^{base of the} mountain ~~to~~ nearly to the marble quarry about two miles above, returning to Keeler along the lake shore. ~~I collected plants at~~
Plants were collected at various points along the route.

May 17. ~~Sunday~~. Mr. Furston came in ^{for provisions} from ~~Cottonwood~~ Willow Creek Cañon, in the Panamint Mountains, ~~for provisions~~
~~where~~ Mr. Nelson and he, ~~with his~~
were encamped. ~~There~~

May 18. ~~I left Keeler~~ Mr. Furston and I left Keeler for Willow Creek Cañon, following the trail over the southern end of the Inyo range south of Cerro Colorado Mountain. After descending the eastern slope of the mountain the trail continues eastward through the yuccas ~~about~~ ^{across} the ~~unbroken~~ northern end of the Darwin mesa, and ~~crosses~~ ^{traverses} the summit of the divide between Saline and

This we have designated Mill Cañon divide.

87

Late in the afternoon we
Panamint Valley. ~~We~~ reached camp,
situated at the lower edge of the ~~main~~ ^{next} pines
about a half-mile west of Jackass
Spring, ~~at~~ ^{and near} the head of Willow Creek
Cañon. ~~late in the afternoon~~

May 19. ^{In the morning we} ~~We~~ went collecting
on the south slope of the ~~south~~ ^{blatte}
~~tain~~ ^{just} north from camp. In the
afternoon we ascended the slope
south of our camp to the sum-
mit of the ridge ~~of~~ overlooking
Panamint Valley.

May 20. I rode to Mill
Cañon divide and southward ^{Two} ~~on the~~
~~Darwin~~ ^{road} a or three miles farther ~~two~~
and Darwin ~~on~~ an old mining
road. ~~I~~ I followed a branch of this
~~around~~ ^{about} to the east and down a
^{side} cañon to the mill in Mill Cañon,
and about a mile farther down.
In returning I ascended the main
cañon directly to the divide.

May 21. Mr. Nelson and I

88

~~with~~ ~~the~~ took a two days' outfit and going to Mill Cañon divide, descended the cañon ^{northwestward} ~~leading~~ into Saline Valley. A few miles below its head this cañon joins that of Willow Creek. We went into camp on the mesa where the cañon opens into Saline Valley. I collected late in the afternoon about a mile up the cañon.

May 22. I returned alone from Saline Valley to our Willow Creek camp. and on the following day reached Keeler by the ~~May 23~~ ~~returning~~ ~~to~~ by the retracing the route of May 18.

May 24, ~~Sunday~~ ^{to 26} I remained at Keeler.

~~May 25. I remained at Keeler.~~

~~May 26. I remained at Keeler.~~

May 27. I went ^{collecting} ~~to~~ into the foothills of the Inyo Mountains ~~up a small~~ cañon northeast from Swansea.

May 28 to June 10. I remained at Keeler, ^{collecting and} determining plants ^{in that vicinity} and writing notes. ~~On the thirtieth~~ On May 30 Mr. Palmer, Dr. Fisher, and Mr. Koch came in from Coso and on June 4 they went on to Lone Pine. On June 7 I rode to ^{the camp at} Lone Pine and ~~returned~~ to Keeler.

June 11. I ~~went~~ ^{drove} from Keeler to Crystal Spring, in the Coso mountains, following the Darwin stage road ~~as far~~ about twelve miles as far as the upper stone corral and turning southward by an old washed road toward Coso. I camped in the dug-out by ~~the springs~~ ^{the springs}, below the beginning of the junipers.

June 12. ~~made~~ ^{collections} were made ~~in~~ in the morning on the slopes about the springs, and in the afternoon in the cañon about ^{one-half} a mile to the south.

June 13. From Crystal Spring I drove down the wash that leads from it, through a narrow cañon, and into the road that leads from Coso

to Darwin. I continued down this to Darwin and ~~afterward~~ by the stage road to Keeler.

June 14, ~~Friday~~ I rode to Lone Pine to receive directions from Dr. Merriam, who had just come in from his Utah trip; ~~and returned~~ ^{I returned} in the evening to Keeler.

June 15. Mr. Nelson and Mr. Furston came in from their trip to the Grapevine mountains returning by way ^{of Mesquit valley} Cottonwood Cañon, and Jackass Spring.

June 16. Mr. Nelson and Mr. Furston went on to Lone Pine, and I busied myself preparing for the journey to Fort Tejon.

June 17. The packing ^{and shipping} of the plant collections was finished, and in the evening I joined the general camp at Lone Pine.

June 18. The day was spent making ^{final} ~~final~~ arrangements for ^{our coming} ~~our~~ journey.

June 19. Our party, composed of Dr. Merriam, Mr. Palmer and myself, started

91
for Fort Tejon. We took the road
down the west shore of Owens Lake, and
camped at night at Walker's ranch, about
a mile north of Olanche post-office.
The route lay in the upper part of the
lower Sonoran but ~~the first~~ ~~the first~~ ~~Larrea~~
Larrea occurred ~~until~~ ~~we reached~~
tonewood ~~creek~~ ^{cañon}. From that point south-
ward it was frequent about the mouths
of cañons.

June 20. We left Walker's ranch
and continued on the road south, pas-
sing Olanche, Haywe meadows, Rose Spring
(more generally known as the goat ranch),
and Little Owens Lake; and made a
dry camp about six miles
south of the latter place. From Rose
spring southward Larrea is abund-
ant and with Franseria dumosa is
characteristic of the region. In the
line of greatest depression in the
valley it is wanting.

June 21, ~~Sunday~~. We proceeded

southward along the stage ~~and~~ ^{fact Indian} route, ^{We crossed}
and ascended the slopes ^{Walker} Pass. ~~at this~~
till ~~opposite~~ the divide of the Sierras here at the al-
titude of ~~we ascended, and~~ ^{feet}, and descended
on the west slope a few miles
to the first ranch on Canabake
Creek. The summit of the pass is
at the uppermost limit of yuc-
cas, on ~~the east~~ ^{a south} slope; ~~and as we~~
~~summit~~ ^{west slope} of the pass ~~crossed the sum-~~
~~mit~~ we came abruptly upon two
~~new~~ and on its western side
Fremont ^{covered with its yellow flowers} ~~and~~ the ^{gray-leaf} ~~ladder~~ pine #

Pinus sabiniana

met our eyes for the first
time.

June 22. ^{Leaving} ~~We~~ left Canabake ranch
we followed the road down to
the south fork of Kern river, ~~and~~
continued ~~along this~~ ^{to its junction}
^{with} the north fork, and then
turning northward ~~continued~~
ranch about a mile south

of Kernville, where we camped.

A phenomenon quite unexpected was presented during the early part of the day's journey. Several ~~characteristically~~ ^{characteristically} desert species were found to occur on the west slope of Walker's pass, ^{some of them} to as low an altitude as ~~the~~ feet. Among these plants are ~~the~~ the following:

<u>Artemisia tridentata</u>	<u>Lycium cooperi</u>
<u>Atriplex canescens</u>	<u>Opuntia basilaris</u>
<u>Artemisia tridentata</u>	<u>Opuntia echinocarpa</u>
<u>Artemisia tridentata</u>	<u>Prunus andersonii</u>
<u>Encelia futescens</u>	<u>Prunus fasciculata</u>
<u>Ephedra nevadensis</u>	<u>Aphelocoma interior</u>
<u>Hymenoclea salsola</u>	<u>Tetradymia spinesa</u>
<u>Lycium andersonii</u>	<u>Yucca brevifolia</u>

Five species of desert plants, ^{are known} ~~did not~~ to occur on the west ^{side} ~~slope~~ of the pass, Larrea tridentata, Franseria dumosa, Atriplex confertifolia, ^{and} A. polycarpa; but these species belong to the lower Sonoran, a zone having no equivalent in the ~~region of the~~ ^{valley of the} ~~south fork~~

94

south fork of Kern River. It may be considered therefore that the ~~whole~~ ^{whole} desert flora, so far as the altitude of the region permits, has overrun Walker's pass ~~about~~ ^{and extends} down ~~into the~~ ^{as far as the} junction of Canebrake Creek with the south fork of Kern River.

June 23. We left Kernville soon after noon ~~and took~~ ^{taking the} ~~road~~ ^{Caliente} road, which leaves the valley of Kern ^{river} a few miles below the fork. ~~As we began~~ ^{at the foot of the} ~~the ascent~~ ^{ascended} of the first divide south of this point, the change from desert to ~~interior~~ ^{intra-montane} flora was ~~found~~ ^{complete}.

The ^{principal} characteristic trees and shrubs are as follows

<u>Pinus</u> <u>sabiniana</u>	<u>Ceanothus</u> <u>cuneatus</u>
<u>Juniperus</u> <u>californica</u>	<u>Ceanothus</u> <u>divaricatus</u>
<u>Quercus</u> <u>wislizeni</u>	<u>Yucca</u> <u>whipplei</u>
<u>Quercus</u> <u>douglasii</u>	<u>Cercocarpus</u> <u>parvifolius</u>
<u>Fremontia</u> <u>californica</u>	<u>Mimulus</u> <u>glutinosus</u>

We camped at the town of Havilah.
June 24.

June 24. We continued on the ^{Caliente} road, crossing a divide into Walker's basin, and then a second divide into ~~Caliente~~ the valley, of Caliente Creek ^{which we followed down} ~~and down~~ to the town of Caliente. From that point we went about four miles on the Tehachapi road and camped at a roadside ranch.

June 25. We continued ^{on the} ~~fast~~ road ~~over~~ the divide into Tehachapi Valley, through the ~~town~~ village of Tehachapi, and on to the ranch near Cameron station at the extreme east ~~at Cameron station~~ end of the valley.

June 26. ^{From our camp near Cameron station} ~~We left~~ we went down through Tehachapi ^{Cañon} ~~pass~~ and over the ~~the~~ ~~hills~~ desert to the town of Mohave.

The change from intra-montane to desert flora ^{in the cañon} ~~at~~ ^{near} Cameron station, and within two miles all the species are those of the desert. Where the cañon opens out into the desert ~~at~~ a few miles east of Cameron

there is no suggestion of an intra-montane flora.

After a few hours' stay at Mohave, we took the road southward toward Antelope Valley and camped at a place called Willow Spring.

June 27. We turned westward along the northern side of Antelope Valley, following an old road which ~~soon~~ soon disappeared. We proceeded across the open mesa several miles and then crossed to the south side of the valley where we came upon a good road. Along this we traveled westward past ^{the house on} Liebr ranch and camped about a half-mile east of Crane Lake.

Larrea ceases about five miles west of Willow Spring, while the ^{terr} yucca continues ^{in the middle of the valley} to ~~at~~ a point within about three miles of Liebr ranch house. The vegetation that replaces ~~the desert shrubbery~~ ~~these desert species~~ is made up of al-

99

most entirely of grasses and other
herbs. On the mountains that form
the southern boundary of the valley,
Pinus sabiniana and Quercus douglasii
extend to a point about three miles
west of Lieber's ranch house.

July 28. We left camp in the
morning and proceeded westward
past Gorman's Station, over the divide,
passing ^{north of} Frazier's mountain and south
of Castac Lake down the Cañada
de las Uvas to Fort Tejon. There ~~we~~
under the giant white oak ^{tree} on
the old parade ground we camped.

Quercus ~~to~~ lobata. See page

June 29, 30. I remained in camp.

July 1. I made an excursion to
^(Kas-tak) Castac Lake, walking completely around
it. The water was but slightly brack-
ish, yet it contained ^{at that season,} so far as a
careful examination showed, only two
aquatics. #

² Ruppia maritima and Chara attenuata

July 2. I collected about the mouth of Johnson ~~to~~ creek, on the hillsides south-west of the fort. The slopes here were covered with ~~two~~ oaks, ^{#1} horse chestnuts, ^{#2} poison ivy, ^{#3} and cercocarpus ^{#4} with a few junipers ^{#5} and the ~~big-core~~ ~~leafy~~ ~~and~~ ~~false~~ spruce ^{#6}.

Quercus chrysolepis, Q. douglasii, Q. wislizeni.

#² Aesculus californica

#⁵ Juniperus californica

#³ Rhus diversiloba

#⁶ Pseudotsuga macrocarpa

#⁴ Cercocarpus parvifolius.

July 3, ~~to~~ ^{to} 5. I remained at camp.

July 6. I went collecting up the ravine of Johnson creek in the mountains back (south) of ~~Fort~~ the fort. At about 500 feet above camp ^{Nevada nut pine} they ~~became~~ ^{became} abundant. ^{Here in this} ~~This~~ region, in which

Pinus monophylla

the Sierras ^{Nevada} and the San Bernardino Mountains intermingle with the coast range, ^{that this tree approaches} ~~is the only~~ ~~forest~~ nearest the Pacific coast. It may be said here

99
to inhabit the coast ranges, indeed it reaches ~~to~~ a point not more than [50] miles in a direct line from the ocean.

July 7. I rode up to the ^{head of a valley} ~~canyon~~ that enters the Cañada de las Uvas from the south, about a mile ^{east of} ~~above~~ Fort Tjon. I then ascended the mountain slopes ~~on the west~~ ^{westward} through scrub-oaks [#]

Quercus dumosa ~~undulata~~

and ~~nut pines~~ ^{pinons} to the summit of the peak, passing on the way a north-sloping ~~low~~ ravine that contained the ~~western spruce~~ ^{white fir} ~~#~~. From the top

Abies concolor

could be seen Fraser Mountain southeastward, Castac Lake and Antelope Valley to the east, the snow-capped high Sierras to the northeast, and ^{northwestward} the ~~deep~~ broad Tulare Plains ending in dusty haze. The summit is here clothed with a chaparral of Eurocarpha parvifolia, Quercus chrysolepis, Ceanothus

Fremontodendron
~~(no 1184)~~ vestitus and Fremontia californicum
 a few hundred feet higher on the
 mountains ~~southward~~ ~~eastward~~ south-
 westward the black pine[#] begins

Pinus ~~ponderosa~~ jeffreyi begins

July 8. I remained in camp.

July 9. Mr. Palmer and I rode
 to ~~Caddo~~ Frazier Mountain following the
 road toward Gorman Station to a
 point about two miles above Castac
 Lake, then ^{From the latter point we,} turning off ^{southwestward to Cuddy's} ~~toward~~
 ranch. ~~We then~~ ascended the west
 face of Frazier Mountain by an old
 road. The base of the mountain is
 clothed with ^{up to pines} ~~pinons~~ and chaparral
 and about half way to the summit
 the ~~jet~~ black pine, ^{with an occasional fir} ~~and the spruce,~~
 begins, ^{continuing in a heavy forest to the summit} From the ~~highest point~~ ^{the en-}
 tire mountain system ^{from which the trees had} ~~of the region~~
^{been removed.}

was exposed to view. We descended the steep northwest slope of the mountain and reached camp late in the evening.

July 10. I remained in camp during the forenoon, and in the afternoon drove to Gorman Station for the mail.

July 11. We ^{broke camp at} ~~left~~ Fort Tejon, ~~and~~ Dr. Merriam having left the party on the June 29. We went down Cañada de las Uvas into the Tulare Plains, ^{and} past Rose Station to Tejon Ranch, where we camped. During our stay here we were most hospitably entertained by the director of the ranch Mr. Pogson.

July 12. Mr. Palmer and I rode up ^{Tejon} ~~the~~ Cañon, ^{which} ~~that~~ furnishes water to Tejon ranch, and ascended one of the higher divides. An old wagon road extends to within

102
a half-mile of the summit and
ends at a deserted shanty.

Near the ~~beginning~~ ^{mouth} of the cañon the
commoner trees are [#]oaks, ^{#2}syca-
mores and ^{#3}poplars, ^{#4}with a few trees of cedar, ^{#5}at about 3000

[#]*Quercus lobata* and *Q. wislizeni* (California post)

^{#2}*Platanus ~~occidentalis~~ racemosa*

^{#3}*Populus monilifera* and *P. trichocarpa*.

^{#4}*Libocedrus decurrens*

feet the ~~portoff~~ ^{gray-leaf} pine ^{#5} begins, inter-

^{#5}*Pinus ~~contorta~~ sabiniana*

mixed with a few ^{Nevada nut pines} ~~foursons~~. Above
these come next the yellow pine ^{#6}

^{#7}*Pinus ponderosa*

and the ^{white} fir ^{#8}, and above them

^{#8}*Abies concolor*

at the summit of the divide ^(about 3300 feet above sea level) and reach

to an altitude of about 300 feet

below the black pine ^{#9} and the

great ^{#10} sugar pine.

^{#9}*Pinus ~~foursonsii~~ jeffreyi*

^{#10}*Pinus lambertiana*

The cañon is remarkable for the ¹⁰³
~~It will be noted~~
unusually large number of cone-
bearing trees that it contains.

July 13. We left Tejon ranch and
~~took~~ followed the road directly to Bakersfield
where we went into camp about a
quarter-mile north of the town.

~~The Tulare plains, ^{between these two points} are black
and bare~~

July 14. I remained at Bakers-
field during the day. Dr. Merriam
met us yesterday and with Mr.
Palmer ^{went by rail to} ~~set out for~~ San Francisco.

July 15. With the teamster and
outfit I left ~~for~~ Bakersfield for
Visalia. We went into the foot-
hills of the Sierras as far as
Poso station on the Glenville stage
line, and then followed Poso ^{creek} ~~trick~~
down to Poso on the Southern
Pacific ~~Railway~~ ^{road} ~~Railway~~.

July 16. We left Poso in the
morning and ~~travelled~~ ^{followed} the road

northward along the railroad, camping at night at a point about one and one-half miles north of Tipton.

July 17. We reached Visalia ^{before noon.} ~~by day~~

~~From this point southward~~

From a point a few miles south of Tulare to ^{the town of} Visalia the soil of the valley becomes moister, and the white oak ^{is} is a characteristic tree.

~~* Quercus lobata.~~

~~We~~ went into camp at a ranch ~~about~~ about a mile northeast from the town.

July 18 to 24. I was occupied in collecting plants in the vicinity of our camp and in ~~preparing for~~ ~~collecting~~ for the ascent of the Sierras.

Mr. Bailey and Dr. Fisher arrived from Bakersfield and Mr. Palmer from San Francisco.

July 25. We all left Visalia and travelled to Three Rivers a post-office in the foot-hills of the Sierras in the valley of Kaweah River.

70

Aesculus californica

Ceanothus cuneatus

Mimulus glutinosus

Quercus douglasii

.. wislizeni

~~Rhamnus~~

Rhus diversiloba

Until we reached the foot-hills the vegetation was similar to that about Visalia. ~~There~~ There Douglas' oak began followed by the other ~~characteristic~~ ^(see slip) ~~vegetation of the~~ ^{characteristic woody} ~~foot-hills region~~

July 26. In the morning I passed the time collecting near Three Rivers. At about one o'clock ~~a~~ one party, consisting of Mr. Bailey and myself, started for Mineral King. We camped at Kansas Flat.

July 27. We continued up the ~~road~~ ^{mountainside} as far as Big Tree cañon where we camped at about the lower limit of the yellow pines. With these grew the giant sequoia[#], the ^{the great} sugar

[#] Sequoia gigantea

pine, ~~and the~~ ^{the California false} ~~the~~ ^{nutmeg} ^{#2}, and the ^{post} cedar,

^{#2} Turion californicum

and the red oak^{#3}

^{#3} Quercus Kelloggii

July 28. Mr. Bailey and I went down the road about three-fourths of a mile

185-

to a ridge upon which stood a deserted house. From this point, which was below the zone of Pinus ponderosa we descended through the dense chaparral to the bottom of the valley reaching the river at the point of its junction with Big Tree Cañon. We returned to camp following part way up the cañon and then climbing the ridge which we had descended. The chaparral here is composed of ~~a Ceanothus~~, Cercocarpus parvifolius, Quercus breweri, ^{Fremontodendron} ~~Fremontia~~ californiana and a Ceanothus which ~~was~~ was not identified. Arctostaphylos

I spent the forenoon collecting in the cañon, above camp; and after dinner we continued a few miles up to the mountain, camping about a half-mile above saw-mill.

July 30. I collected a few specimens about camp, and in the afternoon we proceeded to Mineral King, an old mining ~~camp~~ ^{settlement} now used as a camping ground

~~in summer~~

for summer pleasure parties. We went into camp on the south side of the stream about a half-mile east of the old hotel collected about camp.

July 3rd Mr. Bailey and I ascended the mountain-side north of Mineral King nearly to timber line. The coniferous trees that we found were *Abies magnifica* ^{the California} fir, ^{western juniper} black pine, ^{#2} tamarack pine, ^{#4} little sugar pine, ^{#5} and one of the ^{#6} fox-tail pines.

- #1 *Abies magnifica*
- #2 *Juniperus occidentalis*
- #3 *Pinus ponderosa jeffreyi*
- #4 *Pinus contorta murrayana*
- #5 *Pinus monticola*
- #6 *Pinus balfouriana*

~~Sept. 1~~
Aug. 2 In the afternoon we rode up to the snow on the west slope of Farewell Bend and returned by the same trail.

Aug. 3. I spent the day collecting in the vicinity of camp.

Aug. 4. I drove down the road ^{four or five} miles ^{collecting plants} ~~botanizing~~.

Aug. 5. We moved camp from Mineral King to a ^{group of red firs be-} ~~point on the~~ side the trail about half way to Farwell Gap.

Aug. 6. Mr. Bailey ^{and I} ~~collected~~ followed a trail southward from camp around a spur of the mountain to some ponds in the vicinity of the ^{deserted} White Chief mine. The ^{herbaceous} flora was very rich and new.

Aug. 7 ~~Mr. Bailey~~ ^{and I} ~~retraced~~ ^{we} retraced our steps of the previous day and continued up the mountain-side back (south) of the White Chief mine, past a little lake half filled with ice, to the ~~summit~~ ^{crest of the} mountains. We descended on the other side of the ~~slope~~ ^{summit} a few hundred feet to another lakelet, and then ~~retraced our~~ ^{returned} to camp by the same

route. This was the first collecting that I had done above timber line, ~~and~~

Aug. 8. I collected plants in the vicinity of camp.

Aug. 9 I remained in camp.

Aug. 10. We moved camp ~~from~~ to Lyon Meadows passing over the trail through Farwell Gap. The last few miles of this journey was outside the government reservation, and had been pastured by sheep ^{so closely} ~~so closely~~ that all ~~the low~~ ^{the entire country} ~~the low~~ vegetation ~~had been grazed away~~ was stripped from the ground. We ~~found~~ the same conditions throughout the remainder of our journey in the Sierras. Only in the moister portions of the meadows could the horses get anything to eat.

Aug 11. We continued along the trail to Trout Meadows through a forest made up principally of yellow pine.

Aug 12. We struck out northward from Trout Meadows following the trail to ~~the Kern Lakes Kern River and~~ the north fork of Kern River and continuing up this stream past the two ^{River} Kern Lakes to ~~as the~~ Dick's Meadow ~~the~~ the ~~place~~ ^{place} known in the Wheeler Survey report as Soda Springs. It is now used in summer as a ^{camping} resort for hunting and fishing parties. The river here has an altitude of only ^{feet} and flows southward through a valley between the two main ridges of the ^{southern} Sierras.

Aug. 13 I fished for trout all day in the river.

Aug. 14. In the morning Mr. Bailey and I tramped up the river about four miles, crossed it, and came down on the east side. In the afternoon I

collected ⁱⁿ ~~about~~ the meadow by our camp.

August 15, 16 I ~~remained at camp.~~ ~~spent the day fishing.~~

~~August 16. I remained in camp.~~

August 17. We broke camp at Soda ~~Springs~~ ~~Richie meadow~~ ^{Soda Springs} and proceeded over the ~~Hockett~~ trail to Whitney Meadows.

Aug 18. Mr. Bailey ^{and I} rode over the divide northeast of Whitney Meadows into Round Valley on the headwaters of the south fork of Kern River, and followed this stream up to Big Cottonwood Meadows, where we found Mr. Dutcher and Mr. Koch camped. ~~We~~ I returned to camp by nearly the same route.

Aug. 19. I collected plants ^{near camp} in the meadow. ~~near~~ Mr. Bailey and Mr. Dutcher came into camp late in the afternoon.

Aug. 20. Mr. Bailey, Mr. Dutcher, and I walked along the western edge of the meadows to their northwestern extremity, and following up a little stream ~~we~~

crossed the divide, which is nearly at
timber-line, into a ^{another} broad meadow
north of Whitney Meadows. Traversing
the eastern end of this meadow we
ascended the mountain slope to
the summit, about 500 feet above
timber line. From this point we
looked down upon the little
lakes that form the source of the
south fork of Kern River.

Above timber-line all the vege-
tation was herbaceous and scanty.

We returned to camp by the
same route.

Aug. 21. I collected specimens
near camp in the meadows

Aug. 22. I rode over to Mr. Dutcher's
camp and descended the eastern
slope of the Sierras by the Hockett
trail to Lone Pine. Mr. Nelson and
Mr. Funston had already reached
there and were camped ~~at~~ ^{at Harvey's}
ranch.

Mr. Funston and I drove down to Keeler, ~~where~~ packed up the specimens awaiting shipment there, and returned to Lone Pine.

Aug. 24 I returned to the camp in Whitney Meadows.

Aug. 25. Mr. Bailey and I with a packer and one pack animal set out on the Mt. Whitney trail, crossing the divide northwest of Whitney Meadows, ~~and~~ where we had crossed it Aug. 20, and descending the valley of the first stream westward to a point about eight miles from Whitney Meadows, ~~where we camped.~~ ^{went into camp.}

Aug. 26. We returned to the camp at Whitney Meadows.

Aug. 27. The day was spent making arrangements for the breaking up of the expedition.

Aug. 28. Mr. Funston and I with our packer and outfit left Whitney Meadows and set out on the

113

return to Visalia, by the same route
over which ~~we~~ I had come. We
passed ~~Dicks meadow~~ Soda Springs and the larger
of the Kern ^{River} Lakes, and camped at the smal-
ler one.

Aug. 29 We reached Lyon.
Meadows and camped there.

Aug. 30. We crossed Farwell Gap,
~~and~~ ~~we~~ passed Mineral King, and
stopped at the ranch about a
mile below, where I ~~staid~~ ^{stayed}
over night. Mr. Furston and
the packer went on and camped
at Atwells saw-mill.

Aug. 31. I descended the moun-
tains as far as Bahwell's ranch,
~~the Mr. Furston reaching Three Rivers.~~

Sept. 1. We reached Visalia,
where ~~the next two days were~~
~~spent~~ ^{the next two days were spent,}
~~disposing of the outfit; and~~
~~the botanical field work of the expedition was ended.~~
~~We proceeded to San Francisco, and~~
I proceeded to San Francisco and from
~~from that~~ that point to Washington.